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BOTANICAL ABSTRACTS

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UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

Burton E. Livingston, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. I DECEMBER, 1918 No. 4

ENTRIES 814–1140

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

[Unsigned abstracts are by the editor.]

814. Clute, Willard N. **Botany laboratory equipment.** School Sci. Math. **18**: 492–494. June, 1918 —Something seems to be the matter with botany, it will soon come to an end in school through sheer inanition. Registration in the study has gone down 50 per cent in ten years. *Botany should have a more practical turn. Too many classes are still engaged in* flower analysis, others give too much time to morphology and the alternation of generations. Public demands information about food, fiber and other economic plants. There should be a collection of plants growing in the open, supplemented by a greenhouse. A museum of plant products is also desirable. Frequent field trips must be conducted. General science threatens to include the cream of botany; should this succeed special botany instruction will follow the lepidodendron into oblivion.—*Gundersen.*

815. Shinn, Harold B. **Biology in the high school of tomorrow.** School Sci. Math. 18: 495–499. June, 1918.—Too often discussion of a school question passes into destructive criticism of everything and everybody. In high school botany there is no room for long discussions of algae, ferns or mosses; there should be more planting and care of house plants and grounds. Corn may be studied as intensively as Huxley's crayfish. Biology will become economic, but not mercenary. The commercial courses of today are not educational because their ideal is the dollar. Botany will teach soil fertilization, sterilization and inoculation. There will be more work with forestry, pruning, grafting and breeding. In zoology the study of mammals will be emphasized. High school botany and zoology have advanced quite beyond that of the university, which is now a drag on the high schools. The future text will be written by an advanced high school teacher and the universities will cease to impose *their neomonastic training.—Gundersen.*

816. Holt, Vesta. **Agriculture or botany, which?** School Sci. Math. 18: 505–506. June, 1918.—Botany, as a high school subject, has been in a fair way to be laid on the shelf alongside of astronomy, as not practical. A course in "agricultural botany" proved a success in the Medford, Oregon, High School. The chief industry of the region was fruit raising. Forms of plant life were studied giving attention to physiology, growth and environment. Seed germination, soils, plant pathology, grafting, and plant breeding were then taken up. Also a soil survey with samples, and a collection and study of weeds.—*Gundersen.*

817. Ness, H. **Agricultural text-books for our public schools.** Science **48**: 484–486. Nov. 15, 1918.—Agriculture, as a subject in our public schools, will fail to educate and enter-

tain if heavily burdened with dry recipes for increasing the number of dollars, or lectures upon more physical operations of running a farm. The highly interesting biological, chemical and physical principles underlying these operations would, however, not fail to stimulate and elevate the young mind, as adding interest to the operations in themselves. The language, too, in which these subjects are taught, should be in a simple, yet good virile English. In the greater number of these "text-books on agriculture for the public schools," the pupils are expected to cover more agricultural subjects, frequently crowded together in an incoherent way and stripped of all philosophical connective tissue, than any student in the state agricultural colleges, where he has a four year's course with specialists for teachers, supplied with all the equipments for demonstration. Author urges a return to the idea of "a book about agriculture" and giving up the idea of "productive agriculture" for our public schools.

818. Kirkwood, J. E. **Opportunity and obligation in botanical teaching.** School Sci. Math. **18**: 580–587. Oct., 1918.—Systematic botany for years was the main subject of botanical study and teaching. As the whole of botany consisted in the naming of plants it led to no economic benefit nor to education of cultural value. Laboratory physiology and morphology came as the next stage. The present tendency is toward practical considerations. Scientific agriculture, forestry, pharmacy and bacteriology are closely allied to botany. In the work of the plant breeders lie inconceivable possibilities for food production. The importance of plant pathology is not realized. No line of teaching has greater possibilities than that which deals through the life of plants with the products of the soil. The knowledge of the dependence of human life on plants has a fundamental educational value.—*Gundersen.*

ECOLOGY

H. C. Cowles, *Editor*

[Unsigned abstracts are by the editor.]

819. Andrews, E. F. **The relation between age and area in the distribution of plants.** Science **47**: 142–143. Feb. 8, 1918.—The author, agreeing with Sinnott that other factors than age help to determine the area occupied by a species, notes that the recently naturalized *Lonicera japonica* now has a wider area in the southeastern states than the native longleaf pine. Furthermore this recent immigrant, unlike most introduced weeds, is not confined to cultivated fields and waste places, but invades woodlands and ravines from the sea level to the mountain tops.

820. Bakke, Arthur L. **Determination of wilting.** Bot. Gaz. **66**: 81–116. *5 figs.* Aug., 1918.—Using the hygrometric paper method of investigating transpiration, data are obtained demonstrating the fact that permanent wilting is a definite physiological condition and that the time of its occurrence may be exactly and readily determined by observing the fluctuations of the index of foliar transpiring power. As the time of permanent wilting approaches, the index of transpiring power is considerably lowered, it remains at or near equilibrium for a definite period and then undergoes a decided but rather slight rise. For interpreting these fluctuations the conception of continuous water columns within the plant is assumed and in the condition of equilibrium these columns are supposed to be in a state of highest possible tension. Then the transpiration exerts a force sufficient to cause the serious rupture of the water columns and permanent wilting occurs at the instant of such rupture, being indicated by a slight increase in transpiring power caused by the lessened resistance to the outward passage of water following the break of the water columns. It is suggested that the duration of the period of equilibrinm may give a measure of the drought resistance of different plants. Permanent wilting is also shown to occur earlier in older leaves, the time interval varying according to age.

Graphs of the daily march of foliar transpiring power show that the maximum occurs earlier in the day than the maximum evaporating power of the air, and that the maximum is

ollowed by a decided fall and subsequent recovery, the second maximum being usually omewhat smaller than the earlier one. Helianthus plants were used in this investigation which was conducted in the laboratories of the University of Chicago.—*Geo. D. Fuller.*

821. BLODGETT, F. H. **Weather conditions and crop diseases in Texas.** Mem. Torr. Bot. Club 17: 74–78. June, 1918.—Suggests that organisms commonly regarded as most ensitive to substratum, such as parasitic fungi, mosses and hepatics, may respond to local weather conditions. Proof is offered that *Glomerella Gossypii* Edg. responded to distribution and periodicity of rainfall in Texas, as illustrated on a greater scale than is usually possible by the condition of cotton. Winds may also carry infection, possibly as far as 20 or 30 miles; and it is suggested finally that application of possibly infected irrigation water is still another ource of danger.—*Norman Taylor.*

822. CAMPBELL, D. H. **The Origin of the Hawaiian flora.** Mem. Torr. Bot. Club 17: 0–96. June, 1918.—The evidence of Wallace, Guppy, and others who have shown that the lora of Hawaii is largely endemic and of Asiatic rather than American affinities, is here supplemented from a study of hygrophilous liverworts and filmy ferns. The latter, because of heir rain-forest habit, are not suited to overseas transportation, and must according to the author have existed in Hawaii since its connection with some mainland, now under the sea. Plants of this type now existing show relationship with Java and the Malayan region and Australasia rather than America. So greatly is this true that of 40 species of Pteridophytes, 8 are found in Hawaii and Australasian-Malaysian regions but not in America, while only two are found in Hawaii and America but not in the Orient. Other evidence, such as the essenial continuity of shallows between Hawaii and the East, and the great deeps between those slands and America are noted, and the article closes with a tabulation of flowering plants, based on Hillebrand, showing 45 Hawaiian-Australasian-Malaysian, but not American genera and 7 of Hawaiian-American distribution but not Australasian-Malaysian.—*Norman Taylor.*

823. DUNNEWALD, T. J. **Vegetation as an indicator of the fertility of sandy pine plains soils in northern Wisconsin.** Jour. Amer. Soc. Agron. 10: 19–23. *1 fig.* Jan., 1918.—In making a soil survey of a proposed Forest Reserve area in northern Wisconsin, it was noticed that cut-over sand plains differ widely in the character of their second growth. In the most sandy portions, there is but a sparse second growth of trees, the ground being covered largely by Vaccinium, Pteris, and Myrica; the trees where present are largely *Pinus resinosa* and *P. Banksiana* Where the sand is more loamy, there is a good second growth of various trees ncluding *Pinus Strobus*. It is concluded that the character and size of the plants of cutover lands is a safe indicator of agricultural values. "The heavier growth indicates a higher content of plant food, the presence of more fine material in the soil, and especially a greater capacity of the soil to retain moisture and to enable vegetation and future crops to resist periods of drought." [Abst. in Exp. Sta. Rec. 39: 115–116. 1918.]—*H. C. Cowles.*

824. FARROW, E. PICKWORTH. **On the ecology of the vegetation of Breckland. I. General description of Breckland and its vegetation. II. Factors relating to the relative distribution of Calluna heath and grass heath in Breckland. III. General effect of rabbits on the vegetation. IV. Experiments mainly relating to the water supply. V. Observations relating to competition between plants. VI. Characteristic bare areas and sand hammocks.** Jour. Ecology 3: 211–228. *4 fig. 3 pl.* Dec., 1915. *Ibid.* 4: 57–64. *1 fig. 3 pl.* June, 1916. *Ibid.* 5: 1–18. *1 fig. 6 pl.* Mar., 1917. *Ibid.* 104–112. *1 fig. 2 pl.* June, 1917. *Ibid.* 155–172. *2 fig. 1 pl.* Dec., 1917. *Ibid.* 6: 144–152. *3 pl.* June, 1918.—Situated in Norfolk and Suffolk counties, England, upon sandy soil with only 22½ inches of annual rainfall there is an area developing a vegetation consisting of a transition from a heath, dominated by *Calluna vulgaris*, to a grassland with a short close turf in which *Festuca ovina* and *Agrostis vulgaris* are the most abundant species. Attempts at cultivation have not proved successful and the native vegetation constitutes the nearest approach to continental steppe conditions to be found in Great Britain.

Investigating the effects of a rabbit population on the vegetation Farrow has shown that the presence and the activities of these animals constitute a cause of retrogression sufficient at

times to change a pine forest through Calluna heath and *Carex arenaria* associations to a dwarf grass or a Cladonia heath. Experiments with irrigation and with the application of manure tend to show that both sterile soil and lack of soil moisture are factors in limiting the rate of growth and the luxuriance of the vegetation. This increased growth with improved conditions results in a decrease in the number of species in the area, since the more rapid growth of certain plants like *Agrostis vulgaris* smothers less vigorous ones, such as *Festuca ovina*. Evidence is also presented that such plants as *Pteris aquilina* and Pinus often succeed in competition owing to their dead foliage excluding the light from their competitors causing etiolation and decay. Often the retrogression begun by rabbits is continued by sand blasts and the retrogression shows exactly the reverse order of the succession inaugurated by irrigation, being particularly noticeable in the *Agrostis vulgaris* giving place to *Festuca ovina* wherever the sand blast becomes intensive. Once initiated, bare areas tend to increase, the sand assisting in destroying the vegetation both by direct attack and by removing the substratum, leaving clumps of grass upon the tops of small hummocks which are being constantly undermined. With the checking of wind erosion in such bare areas Polytrichum and Cladonia become agents of stabilization and revegetation. [Rev. by Fuller in Bot. Gaz. 67: 181-182. 1919.]—*Geo. D. Fuller.*

825. Fink, Bruce. **The distribution of fungi in Porto Rico.** Mycologia 10: 58-61. Mar., 1918. In a two months' collecting trip in the winter of 1915-16 it was noted that the rusts, imperfect fungi, black Perisporiaceae, crustose lichens, pyrenomycetes, and Hysteriaceae are abundant. Foliose and fruticose lichens are relatively infrequent. The larger basidiomycetes are strikingly infrequent.—*H. C. Cowles.*

826. Gleason, H. A. **Local distribution of introduced species near Douglas Lake, Michigan.** Torreya 18: 81-89. May, 1918.—A continuation of earlier studies (Bull. Torrey Bot. Club 41: 511-521. 1914) and a confirmation of them. Introduced species seem unable to persist, in competition with native ones, the further removed they are from source of local introduction. This is evidenced by the loss in three years of many introduced species at a summer resort, among the aspens (where, however, those species that survived spread somewhat), and in hardwood clearings. In the latter many 1914 inhabitants died out and were replaced by a new crop of weeds in 1917. 25 species were common to both years and presumably more likely to endure later on. Methods of introduction are dealt with, such as travel through the forest, horse-dung, and otherwise. Concluding notes on behavior of certain introduced species, such as rate of increase, sudden exhaustion, a complete disappearance of unstable ones, confirm general ideas of the precarious and evanescent nature of much introduced vegetation.—*Norman Taylor.*

827. Harper, R. M. **The vegetation of the Hempstead Plains.** [Long Island, N. Y.]. Mem. Torr. Bot. Club 17: 262-286. *3 fig. 1 pl.* June, 1918. A description of an area designated by the writer as a prairie, but not certainly assignable to this vegetation type, by others. It is now about 10 square miles in extent and essentially treeless. Soil is mostly sand and pebbles, perhaps outwash watered from the terminal moraine just to the north.—The vegetation is listed according to the frequency of the 4 trees, 11 shrubs, 40 herbs, and 3 cryptogams, which the author credits to the open plains. Of the herbaceous vegetation, dominated by *Andropogon scoparius*, the estimated yield per acre, when cut in October was 8220 pounds,—air dried 5975 pounds. As showing the influence of water in changing the vegetation a census of the species of the valley of Meadow Brook, which used to flow through the plains but is now nearly dry, lists 15 woody species, 51 herbs and a moss,—nearly, but not quite all different species from those of the plains. There is also a description of a curious "island of trees," dominated by *Pinus rigida*, found in the open plains; some speculation as to the origin of the vegetation of the area and its affinities with other regions in the eastern United States. Fire may have played its part in determining the present condition of the vegetation; and the author points out the probable rapid destruction of a unique type of vegetation within a few years, due to its being the site of Camp Mills and to other causes.—*Norman Taylor.*

828. Harris, J. Arthur. **On the osmotic concentration of the tissue fluids of desert Loranthaceae.** Mem. Torr. Bot. Club 17: 307-315. June, 1918.—Three species of Phoradendron growing upon a number of different hosts in the Arizona deserts have been investigated and the osmotic concentration of the tissue fluids are found by the freezing point method to be approximately twice as great as that of related species growing in the montane rain forests of Jamaica. The osmotic concentration of the tissue fluids of these desert parasites is generally greater than that of the host, a typical example showing the average concentration of the former to be 28.63 and of the latter 24.50 atmospheres.—*Geo. D. Fuller.*

829. Harris, J. Arthur. **On the osmotic concentration of the tissue fluids of phanerogamic epiphytes.** Amer. Jour. Bot. 5: 490-506. Nov., 1918.—Investigation of the osmotic concentration of the tissue fluids of epiphytic Bromeliaceae, Orchidaceae, Piperaceae, and Gesneraceae from the montane rain forests of Jamaica and from the subtropical forests of Florida show that the osmotic concentrations of the species from the former habitat is lower than that from the latter. In both regions the osmotic concentration for the epiphytes is lower than that of terrestrial vegetation. In the Jamaican forests the epiphytes show from 37 to 60 per cent of the concentration characteristic of herbaceous terrestrial vegetation and from 28 to 45 per cent of that of ligneous terrestrial plants.—*Geo. D. Fuller.*

830. Hazen, T. E. **The trimorphism and insect visitors of *Pontederia cordata*.** Mem. Torrey Bot. Club 17: 459-484. *12 fig. 2 pl.* June, 1918.—Examination of many plants shows that *Pontederia cordata* has three distinct types of flowers (*1*) short-styled, with the longest and mid-length stamens protruding, (*2*) mid-styled, with only the long stamens protruding, (*3*) long-styled, mid-stamens only just protruding. In (*3*) the style is itself exserted, in (*2*) only very slightly so, and not at all in (*3*). "The ratio of the average length of the long pistils to that of mid-length pistils is approximately as 100 to 60; and the average height of the long pistils to that of the short ones is as 100 to 22." This trimorphism may obviously result in six legitimate crosses between six sets of stamens and the three different lengths of pistils, which is illustrated by a diagram. The different style lengths are found on different plants, which show some tendency to make locally exclusive growths. Insect visitors recorded are 10 Lepidoptera, 4 Hymenoptera, 1 Diptera, and perhaps others. Self pollination is probably possible but rare, a constant procession of insects insuring almost universal cross-pollination. The author also records that *Pontederia cordata* at Arcola, N. J., where the studies were made, is, contrary to usual notions, found in a place that is "daily bathed or even flooded by tide water." [Rev. by Wylie in Bot. Gaz. 67: 271-272. 1919.]—*Norman Taylor.*

831. House, H. D. **Vegetation of the eastern end of Oneida Lake** [N. Y.]. Bull. for 1917, New York State Museum 197: 61-71. May, 1918. [Illus.]—A description of Geology, Climate, Life Zones, Forests, Shore-vegetation, etc. with lists of species given for some of the plant associations.—*Norman Taylor.*

832. MacCaughey, V. **Strand Flora of the Hawaiian Archipelago. I. Geographical relations, origin and composition.** Bull. Torrey Bot. Club 45: 259-277. July, 1918.—After discussion of geographical isolation of the islands, and tremendous deeps that occur in the sea near them, ocean currents are shown to be more effective from America than the Old World, as a possible source of strand colonizers. Methods of introduction as outlined by Schimper, Wood-Jones, Tansley and Fritsch, Hooker, Mosely, and Guppy are dealt with, and the peculiarly endemic nature of the Hawaiian strand flora, is emphasized. The latter is the remarkable feature of the flora of the strand, which in most oceanic islands is nearly cosmopolitan. Of interest is the fact that sea-borne colonists of the Hawaiian strand are at least partly of American origin, while the pteridophytes of the interior (see Bot. Absts. 1, Entry 822) rainforest, not at all suited to oversea transportation, are only very slightly so. Thirty-two species are listed as endemic littoral or practically littoral plants which may well exceed that from any other region in the world. With only something over 80 species recorded from the strand these 32 endemics are extraordinary. Of these, 13 are woody plants and 19 herbs,

suggesting that woody species do not outnumber herbaceous ones in this strand element of the Hawaiian endemics, contrary to the percentages for the total endemics of the islands as given by Sinnott and Bailey (Ann. Bot. 28: 574. 1914).—*Norman Taylor.*

833. Nichols, George E. **The vegetation of northern Cape Breton Island, Nova Scotia.** Trans. Connecticut Acad. Arts and Sci. *22:* 249–467. *70 figs.* 1918.—This island, lying between 45.5 and 47 degrees North lat., possesses upon the lowlands along the coast a climax forest of the deciduous type, in which *Fagus grandifolia, Acer saccharum,* and *Tsuga canadensis* are dominant. In contrast to this, the granitic uplands constituting the whole interior of the island display as a climax vegetation a coniferous forest composed of *Abies balsamea, Picea canadensis* and a small amount of *Betula papyrifera.* The successions leading to these forests are traced and the relationships of the two climax types are considered. They appear to be equally mesophytic as shown by similar species in the undergrowth, in which *Taxus canadensis, Acer spicatum, A. pennsylvanicum,* and *Sorbus americana* are the principal shrubs, while among the herbaceous vegetation are *Phegopteris spp., Aspidium* spp., *Clintonia borealis, Linnaea borealis, Cornus canadensis, Actaea alba,* and *Viola canadensis.* Upon the destruction of the deciduous forest of the lowlands by cutting or fire it is succeeded by one in which Abies and Picea are dominant. This and the presence of considerable numbers of Abies of small size in the deciduous forest raises the question of why the balsam fir is apparently unable successfully to compete with the beech and maple. Nichols finds that its seedlings are fairly tolerant of shade and that its failure is due to its shortness of life, reaching maturity in about a century, and to its susceptibility to fungous diseases.

The factors in regard to which the upland climate differs from the lowland appear to be the greater extremes of temperature in the former situation and the fact that the uplands which have an average elevation of 1000 feet are frequently enveloped in fog and low-hung clouds which are absent below. Large areas of the more exposed upland have an aspect similar to the tundra due to the degeneration of the conifer forest to a "Krummholz," a coniferous heath and even to a shrub heath. These associations constitute "the barrens" which Nichols regards as possessing an edaphic rather than a climatic vegetation.

Several problems are elucidated, especially those connected with bogs. The sphagnums are placed in five ecological classes ranging from aquatic to comparatively xerophytic in habit. The mesophytic and xerophytic types are cushion-forming and through their agency numerous raised bogs are developed. These seem equivalent to the "Hochmoor" of Europe and seem to require for their development a climate characterized by abundant precipitation, relatively low atmospheric humidity, cool summers, and the absence of the extremely low winter temperatures found on the mainland. Among the more important edaphic factors, an impervious substratum stands first and is afforded by the glaciated granite surface. This assists in the retention of the water supply which comes exclusively from rain and not from springs. The cushion-forming sphagnums, coming in during the later stages of bog development, result in a convex surface, the central portion of the bog often rising from 5 to 15 feet above its margin. This surface is hummocky, rather firm and springy and usually relatively dry. In addition to the sphagnums its vegetation consists of such other mosses as Polytrichum and Racomitrium, and some fruticose lichens such as *Cladonia* spp., small ericaceous shrubs and scattering, very stunted individuals of *Picea mariana* and *Larix laricina.* Among other details is the description of subsequent bog ponds formed by the impervious sphagnum peat damming back the water draining down gentle rock slopes. These also act as reservoirs for the rainfall insuring to adjacent areas a constant supply of moisture throughout the season.

In arranging the various plant communities, Nichols uses a new scheme of classification in which the association is the fundamental unit. The association complexes constitute edaphic formations and these in turn make up climatic formations.—*Geo. D. Fuller.*

834. Nichols, Geo. E. **The sphagnum moss and its use in surgical dressings.** Jour. New York Bot. Gard. *19:* 203–220. Sept., 1918.—While the primary purpose of this paper is indicated in the title, it contains notes on the ecology of Sphagnum, some details of its struc-

ture, and descriptions of the peculiarities of various species. The distribution of various types of bogs in Maine and in the eastern provinces of Canada is briefly sketched.—*Geo. D. Fuller.*

835. PETRY, LOREN C. **Studies in the vegetation of New York State. II. The vegetation of a glacial plunge basin and its relation to temperature.** Bull. Torr. Bot. Club **45**: 203–210. *3 fig.* May, 1918.—In certain rock basins of glacial origin near Syracuse, N. Y., very low temperatures of both soil and air prevail throughout the year, the differences between the rim and bottom of the depressions often amounting to as much as 15°C. These low temperatures are shown to be the controlling factors in causing the presence of plant associations characterized by the dominance of plants usually found only in much more northern habitats. Their local distribution is shown to coincide very exactly with the areas bounded by the isothermal lines of low temperature. [Rev. by Fuller in Bot. Gaz. **67**: 184. 1919.]—*Geo. D. Fuller.*

836. PITTIER, H. **Our present knowledge of the forest formations of the Isthmus of Panama.** Jour. Forestry **16**: *76–84*. Jan., *1918*.—"This is a brief account of some results of the study of the flora of Panama made in connection with the general biological survey organized by the Smithsonian Institution." More than half of the country is covered by forests, most of the remaining territory being savanna. Most of the forests are primeval and to be classed as rain-forests, with a dominance of mesophytic dicotyledonous trees. Cauliflory and plank roots are common, and the trees are conspicuously arranged in tiers. Monsoon forests occur on the Pacific slope, *Cavanillesia platanifolia* being everywhere characteristic. [Unsigned rev. in Geographical Review **5**: 417. 1918.]—*H. C. Cowles.*

837. SMITH, WM. G. **The distribution of Nardus stricta in relation to peat.** Jour. Ecol. **6**: 1–13. *2 pls. 1 map.* Mar., 1918.—This grass is widely distributed on moor and heath in many parts of Europe, the present study being made in the hilly parts of northern Britain. Here it forms the dominant member of a plant association marginal to areas of retrogressive peat. It typically occurs upon material that has been redistributed from exposed and elevated masses of peat through the agency of water, wind, or other factors. This community is relatively fixed, fairly extensively developed, and forms a rather important although somewhat unproductive part of the grazing lands in the subalpine region of the central and northern hills of Britain. The usual composition of the association is determined and the effect of such factors as spring water, manuring, grazing, and burning is investigated.—*Geo. D. Fuller.*

838. TAYLOR, NORMAN. **A quantitative study of Raunkiaer's growth-forms as illustrated by the 400 commonest species of Long Island, N. Y.** Mem. Brooklyn Bot. Gard. **1**: 486–491. 1918.—Upon grouping the species for *(1)* the vicinity of New York, *(2)* the whole flora of Long Island and *(3)* the 400 commonest plants upon Long Island, according to Raunkiaer's scheme the resulting spectra show a rather remarkable agreement. Quite as remarkable is their divergence from the normal spectrum especially in the percentage of herbaceous plants. This leads to the conclusion that the normal spectrum is probably in error and that further study will probably lead to its readjustment.—*Geo. D. Fuller.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

[Unsigned abstracts are by the editor.]

839. ASHFORD, W. G. **The Forest Policy in New South Wales.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. P. 22–24.—The fundamental requirements of State Forestry are *(1)* Stable and expert management; *(2)* Assured certainty of policy; *(3)* A fixed system of finance. The 1916 Act granted to New South Wales:—*(1)* A State forestry board untrammeled by political action. *(2)* Executive and administrative

powers to establish a settled policy and to maintain continuity. (3) Allocation of 5,000,000 acres of public land as State Forests. (4) Allotment to the Commissioners of 50 per cent of the forestry revenue for re-expenditure on forest works.—A Commission of three is to handle the work of the forests, one of whom is to represent the state proper, one to be a technical forester, and the third to be a business expert. The work will be divided under three heads, that of administration and finance, that of forest management, and that of commercial development. One unified system to result and the handling of the State Forests and of the Crown lands is to be under its control.—Work already under the Commercial Development has resulted in the establishment of two large sawmills, which, in a competitive sale to the Government of 1,250,000 feet of lumber, saved £1,560 to the State over the nearest competitor. The auditor reported that on one year's business, with a turnover of £10,720, a profit of 15 per cent was made after all charges for overhead, interest, depreciation, and profit and loss had been deducted.—*Edw. N. Munns.*

840. Gill, Walter. **The introduction of the remarkable pine (P. radiata or P. insignis) into South Australia and its successful utilization.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917, 24–26.—The wood of the planted Monterey pine in South Australia has shown itself adapted to all uses such as the white pine (*P. strobus*) has been used in. Various articles of furniture made 25 years ago of the wood of 10-year old trees are still serviceable. Plantations 24, 26, and 30 years of age show that the annual increment of the trees is 160 cubic feet, or 2000 "superficial feet" per acre, 2769 superficial feet, and 2943 superficial feet per acre respectively. The 26-year old stand had a volume of 72,000 superficial feet per acre, and the 30-year old stand one of 88,308 superficial feet per acre. A sawmill established in a 33-year old plantation cut over 100,000 superficial feet per acre, an annual increment of 3030 feet. The wood is used for boxing and for house construction.—*Edw. N. Munns.*

841. Howard, Albert. **Recent investigations on soil-aeration. Part I. With special reference to agriculture.** Indian Forester 44[5]: 187–202. May, 1918. An abridgment is given of the recent work of a number of investigators on the influence of aeration on plant life. This is shown in the rate of growth, the quality of the product produced, and in the distribution of plants.—*Edw. N. Munns.*

842. Hole, R. S. **Recent investigations on soil-aeration. Part II. With special reference to Forestry.** Indian Forester 44[5]: 202–212. May, 1918. A study of the factors influencing germination and seedling development of the sal, *Shorea robusta*, revealed that soil-aeration was of primary importance. Soils with poor drainage and in which the amount of CO_2 increased rapidly, caused the death of the small trees. Soil-aeration was found to depend upon the amount of water in the soil, the amount of organic matter present, the number and kind of soil organisms, and the rate at which currents of air, or water with oxygen in solution, penetrate into and percolate through the soil. Ordinary forest operations can control these factors without drainage through the density of shade and amount of organic matter, the use of fire and earth and similar means. The sal root-fungus, *Polyporus shoreae*, is most destructive in badly aerated soils, and limits the sal to the well drained sandy or gravelly lands. Dense growth of grass in a forest may cause the rain water to become heavily charged with CO_2 and influence the rate of growth to a great extent.—*Edw. N. Munns.*

843. Jolly, N. W. **Araucaria cunninghamii—The hoop pine.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. *P. 92–94.*—A silvical description of the hoop pine in Australia. The distribution, development, and habitat are described and some data on the rate of growth are given. Annual shoots of 10 feet have been recorded for some trees and diameter increments of 1¼ inches and over per annum. Reproduction is by both seed and coppice, and, though the latter is strong, it is not vigorous enough to be used in forest management. Natural reproduction must be assisted by suitable soil conditions, an overhead shelter, fire protection, and finally by the later removal of the shelterwood. The enemies of the tree that are of special importance are fire, insect borers, and rodents in the drier localities.—*Edw. N. Munns.*

844. JOLLY, N. W. **Cedrela australis—The red cedar.** Rept. Interstate Conference Forestry. Perth, Nov., 1917. *P. 94–95.*—The habitat, development and silvical characteristics of the tree are described for this important Australian hardwood. Methods of natural reproduction and management of the tree are described which show that it may be handled either by coppice or by seeding. Natural reproduction by seed is difficult because of the ravages of the cedar twig borer (*Hysiphyla robusta*). Scrub wallabies, rats, and opossums do considerable damage.—*Edw. N. Munns.*

845. MACOUN, W. T. **Winter injury to trees, 1917–18.** Canadian For. Jour. 13: 10. Nov., 1918.—The effect of the severe winter of 1917–18 on apple trees is described. Thirteen forms of frost injury are described, the chief form of injury being to trunk or body injuries. The reason ascribed is that the long continued cold weather without thaws caused the trees to lose moisture until they had lost so much that recovery was impossible. Maples, pines, poplars, locusts, oaks, and chestnuts suffered various kinds of injuries. Many exotics were badly injured.—*Edw. N. Munns.*

846. MAIDEN, J. H. **The trees of Western Australia.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. *P. 11–17.*—This paper is divided into sections on Bibliography, Horticultural value of trees and shrubs, and Eucalypts and minor species.—Under "Bibliography" critical comments of six books on eucalypts are given with lists of some of the important eucalypts of Western Australia. In the second section the value of certain shrubs and trees are described and their cultivation urged.

About 120 species of Western Australia eucalypts are given, the lists being divided into endemic species, those with horticultural value, dry country species, shrubs or small trees not yielding merchantable timber, and tropical trees. Short descriptions of some of the species are given. About 230 species of *Eucalyptus* are now described.—Under minor species it is stated that there are some 500 species of wattles (*Acacia*), most of which are but little known and very poorly represented in the herbaria.—*Edw. N. Munns.*

847. RHOADES, VERNE. **Ice storms in the southern Appalachians.** Monthly Weather Rev. 46^{8}: 373–4. Aug., 1918.—An account of the effect of an ice storm in 1915 upon forest growth in the North Carolina Mountains. Trees of 16 inches and large branches were broken off while many trees were bent to the ground. [See the next entry.]—*Edw. N. Munns.*

848. ASHE, W. W. **Note on the preceding.** Monthly Weather Rev. 46^{8}: 374. Aug., 1918.—A comment on conditions is given, in which characteristics of the forest tree species after severe ice storms are portrayed. The dates of these storms can often be calculated from the crooks in the stem at the point of development of new leaders. [See preceding entry.]—*Edw. N. Munns.*

849. RYAN, G. M. **Suggestions to introduce special working plans for the exploitation of Bassia latifolia and Bassia longifolia in India.** Indian Forester 44^{7}: 291–315. July, 1918.—The corollas of the Bassia trees are of great value as a source of an intoxicating liquor and of food, while the acetone yield is ten times that obtained by the distillation of woods. The acid export for the manufacture of margarine is very large.—The burning of the litter to make the corolla collection easy and to permit the collection of seeds is preventing natural reproduction. Planting for the production of seed and of the corollas is recommended.—*Edw. N. Munns.*

850. SECREST, EDMUND. **Meeting the wood fuel situation.** Ohio Agric. Exp. Sta. Monthly Bull. 3^{10}: [whole no. 34.] Oct., 1918.—Information is given on the value of local species for fuel, and the weights of the woods and their equivalents in coal. Information as to machinery, costs, and methods of preparing wood fuel are presented in a popular manner.—*E. R. Hodson.*

851. SECREST, EDMUND. **War time uses of timber.** Ohio Agric. Exp. Sta. Monthly Bull. 3^{11} [whole no. 35.] Nov., 1918.—Black walnut for gunstocks and airplane propellers was in

great demand and coöperative methods of handling the sales to make car-load shipments are described. Small trees and shade trees were not needed. White ash for airplanes and handles was greatly needed and the care necessary in getting this material without waste is portrayed. Oaks were used for artillery, motor truck, and ship-building purposes, and the locust for treenails. Care of young growth and the plantation of additional trees are urged. —*E. R. Hodson.*

852. SMYTHIES, E. H. **Notes on the dying bark of sal seedlings.** Indian Forester 44[9]: 420–422. Sept., 1918.—A study of one year old seedlings of sal (*Shorea robusta*) shows that under heavy shade the seedlings continue to die back through both the cold weather and the hot weather. A heavy clearance and removal of shade causes those seedlings which would die back to do so immediately, and at the beginning of the following hot weather, many seedlings which had died back in the cleared area start to grow and persist through the hot weather. On shaded areas this effect does not occur.—*Edw. N. Munns.*

853. SUDWORTH, GEORGE B. **Miscellaneous conifers of the Rocky Mountain region.** U. S. Dept. Agric. Bull. 680. Contrib. from Forest Service. *44 p.* 1918.—Nine species found in the Rocky Mountain region are described in this bulletin. These are *Larix laricina, L. occidentalis, L. lyallii, Tsuga heterophylla, T. mertensiana, Pseudotsuga taxifolia, Libocedrus decurrens, Thuja plicata,* and *Taxus brevifolia.* The generii characteristics of the genera are given, with a botanical description of the various species, the important silvical characteristics and manner of growth, methods of regeneration and sizes of the trees. Keys for the identification of genera and species are given, with a map of North America on which the geographic distribution of the trees is distinctly portrayed.—*Edw. N. Munns.*

854. SWAINE, J. M. **A new forest insect enemy of the white birch.** Canadian For. Jour. 14[10]: 1928–29. Nov., 1918.—In one section of Quebec 50 per cent. of the *Betula alba* were badly diseased and injured by the bronze birch borer, *Agrilusanxius.* The eggs are laid in the bark in June and girdle the tree. Winter is passed in the larval stage, and the adult leaves in June of the following year. For control measures, the cutting of the tree and its utilization in winter is recommended for small areas. Under present conditions it can not be controlled with any great degree of success on large areas. Yellow birch, *Betula lenta,* is not as seriously affected.—*Edw. N. Munns.*

855. WATSON, H. W. A. **Forestry in Lower Burma.** Indian Forester, 44[5]: 212–217. May, 1918.—Forest management in the Lower Burma region suffers from the application of the Selective System; the necessity of supplying the plains population with timber; the lack of system or definite end under which the Improvement Fellings are carried out; the uncertainty of the flowering of the Kyathaung bamboo; and the neglect of the " taungya " cutter. Suggestions are given whereby silvicultural methods can be put into effect. The "Uniform System " with regeneration on the French "*Quartier bleu*" system is indicated.—*Edw. N. Munns.*

856. WHITFORD, H. N. **The great timber wealth of South America.** Canadian For. Jour. 13[8]: 1833–34. Aug., 1918.—A short description of the timber conditions and stands in South America, is followed by an estimate of the area in forests. As yet no lumbering has taken place though there is an area of 130 million acres in merchantable forest with a stand of some 650 billion feet.—*E. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

857. ADAMETZ, L. **Studien über mendelsche Vererbung der wichtigsten Rassenmerkmale der Karakulschafe bei Reinzucht und Kreuzung mit Rambouillets. [Studies on the Mendelian inheritance of the most important racial characters of the Karakul sheep in pure breed-**

ing and in crosses with Rambouillets.] [Review by V. Haecker, from Bibl. Genet. 1. 1917.] Zeitschr. f. indukt. Abstamm. u. Vererb. **19**: 115–123, Mar., 1918.

858. Allen, E. J., and E. W. Sexton. **The loss of the eye-pigment in Gammarus chevreuxi. A Mendelian study.** [Abstract from Jour. Marine Biol. Assoc. **11**: 273–353. *7 pl.* 1917.] Jour. Roy. Microsc. Soc. **1918**: 195, June, 1918.

859. Arny, A. C., and R. J. Garber. **Variation and correlation in wheat, with special reference to weight of seed planted.** Jour. Agric. Res. **14**: 359–392, Aug., 1918.—Correlation studies were made on size of seed planted and plants produced in four crops of wheat. Review of literature is given. Various constants for large number of characters are determined and relation of environment to variation discussed. Means show that the various characters responded to growth conditions. Standard deviations for each character were in general largest where means were greatest, due to favorable conditions for development. Some exceptions to this rule were noted. With few exceptions coefficients of variability were higher in 1914 when means were lower.—Authors conclude that "correlation between weight of seed sown and resultant plant characters at maturity, is not high in any instance and may be so modified by environmental conditions that the relation may be slight or obliterated entirely."—Interrelation of plant characters is discussed. It was found that such correlations were modified by environment, depending on characters concerned.—*H. H. Love.*

860. Bauer, Julius. **Die konstitutionelle Disposition zu inneren Krankheiten.** [The constitutional disposition to internal diseases.] [Review by V. Haecker, from book. *586 p.* J. Springer, Berlin, 1917.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 98–109. Mar., 1918.

861. Bell, W. Blair. **The sex complex.** *8vo, xvii 233 p. 50 fig.* Ed. Baillière, Tindall & Cox, London, 1916.—Abstract by J. Arthur Thomson in Scientia **24**: 62–63. 1918.

862. Blakeslee, A. F., and B. T. Avery, Jr. **A vegetative reversion in Portulaca.** Mem. Brooklyn Bot. Gard. **1**: 18. 1918.—Dwarf appeared among plants from commercial seed of *Portulacca grandiflora*. Dwarfs selfed produced only dwarfs, some of which carried reverting branches. These had red instead of green stems and had longer internodes. Flowers on both dwarf stock and reverting branches were red. Selfed seed from reverting branches produced both dwarf with short internodes and normal branches with long internodes, as well as occasional dwarfs that showed reverting branches.—*R. J. Garber.*

863. Bleuler, E. **Mendelismus bei Psychosen, speziell bei der Schizophreuie.** Verl. von O. Füssli. [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. 1[1]. 1917.] Neurol. Centralbl. **1918**: 124. Feb., 1918.

864. Boas, Helene M. **The relationship between the number of sporophylls and the number of stamens and pistils—a criticism.** Bull. Torrey Bot. Club **45**: 343–345. Aug., 1918.—Criticism of recent paper by Harris, who found positive correlation between number of sporophylls in flowers of Ficaria, and deviation of pistils from number which would occur if ratio of pistils to stamens were constant. He interpreted his results as indicating biological relationship between increase in sporophyll number and tendency toward femaleness. Miss Boas points out that positive correlation is merely mathematical consequence of fact that pistils are as variable in number as stamens, but are less numerous.—*Sewall Wright.*

865. Brotherton, Wilber, Jr., and H. H. Bartlett. **Cell measurement as an aid in the analysis of quantitative variation.** Amer. Jour. Bot. **5**: 192–206. Apr., 1918.—Variation in length of internodes is correlated with cell number or cell size or both. Influence of light on internode length in *Phaseolus multiflorus* is studied in relation to the length and number of epidermal cells. Growth in darkness results in elongation of internodes to 3.6 times length of normal internodes grown in light, 55 per cent. of increase being found to be due to increased cell division and 45 per cent. to greater extension of cells.—*J. P. Kelly.*

866. CAPORN, A. ST. CLAIR. **The inheritance of tight and loose paleae in Avena nuda crosses.** Jour. Genetics 7: 229–246. Aug., 1918.—Crosses between oats with tight paleae and *Avena nuda* with loose paleae were made. Three varieties with tight paleae were used, two white and one black-glumed. *Avena nuda* has several flowers in spikelet, other types usually two. Variety of *A. nuda* used showed mixture of gray and white glumes.

The F_1 plants produced heads having some many-flowered spikelets of *nuda* type, occurring nearer tip of head. Spikelets near base of heads were usually two-flowered. Paleae showed all gradations from pure tight to pure loose. Tight paleae occur in greater numbers near base of head, being correlated with few flowers in spikelets. Tight and loose paleae occur in varying relative numbers on F_1 heads.

F_2 and F_3 generations indicated 3 : 1 ratio with tight paleae recessive. From 119 sowings of F_2 plants 610 pure tights and 1835 not pure tights were obtained. Only 46 pure loose plants were obtained. Not pure tights were grouped into four classes: tight-containers, hard backs, penulti-looses, pure looses, depending on amount and nature of sclerotic tissue surrounding kernels. These various *nuda* types produce different results when tested, (A) throwing tight-containers, hardbacks, penulti-looses, and pure looses; (B) tight-containers, hardbacks, and penulti-looses; (C) tight-containers and hardbacks; (D) hardbacks, penulti-looses, and pure looses; (E) penulti-looses and pure looses. While it seems that tight paleae are represented by a single factor, author suggests following other factors which may operate to cause modifications of the not-tight forms; *X*, rendering all paleae pure tight; *Y*, rendering some only of paleae pure tight; *Z*, rendering some paleae more or less sclerotized but never wholly tight.

Number of flowers per spikelet on tight forms was not increased. Color and loose paleae are inherited independently.—*H. H. Love.*

867. CAPORN, A. ST. CLAIR. **An account of an experiment to determine the heredity of early and late ripening in an oat cross.** Jour. Genetics 7: 247–257. Aug., 1918.—Cross between early- and late-maturing oat was studied. Blooming periods of parent forms did not overlap. F_1 types generally intermediate. F_2 gave early, intermediate and late forms. Two of 106 plants were nearly as early as early parent, none so late as late parent. Intermediates ranged from early to late. Author concludes that earliness is possibly a function of three factors. A type which is comparatively early, in that its F_3 period never extends into the period of the late parent, is segregated on a 1 : 3 basis.—*H. H. Love.*

868. CAPRON, A. ST. CLAIR. **On a case of permanent variation in the glume lengths of extracted parental types and the inheritance of purple colour in the cross Triticum Polonicum × T. Eloboni.** Jour. Genetics 7: 259–280. Aug., 1918.—*Triticum polonicum* having long glumes and colorless kernel, and *Triticum eloboni* having short glumes and purple kernel were crossed. Purple color is in pericarp. F_1 type has glumes intermediate in shape and size between those of parents, grains being purple. In F_2 183 plants were examined and gave some short-, some long-glumed, and a large number of intermediates. Curve of glume length falls into three periods. Similar result is obtained in F_3 from seed of 10 heterozygous F_2 plants. In F_3 170 F_2 plants segregated as follows: 41 short, 87 short, medium and long, and 42 long, indicating that long and short glume follows 1 : 2 : 1 ratio.

Kernel color in F_2 showed 28 flushed, 8 streaked and 136 non-colored, indicating 3 : 1 : 12 ratio. Color depends some on amount of light as to its development and is brought out by treatment with sulfuric acid. Of 123 non-colored F_2 plants 111 threw non-colored in F_3, and 12 threw non-coloreds and streakeds. Author believes two kinds of non-coloreds in F_2 were to each other as 15: 1. Results of F_3 were contradictory to F_2, for in F_2 12 non-colored : 1 streaked : 3 flushed were obtained, while in F_3 the results were 12 flushed : 1 non-colored : 3 streaked. Comparisons were made between these results and those obtained by East and Hayes (Inheritance in maize—Conn. Agric. Exp. Sta. Bull. 167, p. 57–104.) Author concludes that "segregations analogous to the F_2 segregation have not been found in the F_3 generation. Streaking, a character which suddenly appeared in the F_2 generation, has resemblances to particolouring in maize."—*H. H. Love.*

869. CAULLERY, M., AND F. MESNIL. **Dimorphisme évolutif chez les Annélides polychètes.** Compt. Rend. Soc. Biol. 81: 707–709. July, 1918.—Dimorphism is found in developmental stages. Epitoke females of two sizes, with or without corresponding males, and atoke females with parthenogenetic eggs, exist in one species. Larvae may be pelagic for a time, or develop directly into adult. In Spio dimorphism is seasonal, in Polygordius geographic. Three species of Polygordius may be one species, since only larvae differ. One group is epigamic or epitoke in simple cases, or variously combines schizogamy, blastogenesis, sexual stolons, and viviparity.—*A. F. Shull.*

870. CRAGG, E., AND H. DRINKWATER. **Hereditary absence of phalanges through five generations.** [Review by J. F. van Bemmelen, from Jour. Genetics 6. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 95–96. Mar., 1918.

871. CUTHBERTSON, W. **"Rogues" among potatoes.** Gard. Chron. 64: 102. Sept. 7, 1918.—Writer takes exception to statement by Mr. Jackson that "rogues" should be preserved owing to possibility of new sorts arising by vegetative variation. He states that he has found no important variants during twenty-five years. Color variations, however, have been found, e.g., King Edward gave tubers red in color, the color being maintained when propagated. Northern Star, which has touch of reddish-purple color in eye, gave tuber with eye-color distributed over whole tuber. Color of latter variety also remained constant when propagated. Indisputable evidence of mutation is requested.—*H. K. Hayes.*

872. DAVENPORT, C. B. **Department of experimental evolution.** Carnegie Inst. Washington Year Book 16 (1917): 111–132. 1918.—A summary is given of progress by the Station at Cold Spring Harbor during 1917. Metz's studies on chromosome complex of *Drosophila ampelophila* and related species reveals series of twelve types; breeding of *D. virilis* for comparison with *D. ampelophila* has shown degree of mutability in *D. virilis* equal to that in *D. ampelophila*, with mutants of same general types; linkage and crossing over occur as in *D. ampelophila*; five linkage groups already known in *D. virilis* and discovery of sixth is anticipated since this species has six chromosome pairs; two mutants proved as incompatible in reproduction as species in nature. MacDowell found developing male rats subjected to daily doses of alcohol vapor 20 per cent. lighter than normal brothers at end of half a year; imbibition of alcohol reduced fecundity to one-third. MacDowell has published on selection for bristle number in Drosophila and Riddle on significance and control of sex in pigeons. Two rare defects of pigeons, ataxia and scraggly plumage, were perpetuated by Riddle to fourth generation; formation of melanin was induced in choroid of albino dove, free oxygen being found necessary. Banta discovered environmental factors induce occurrence of sexual individuals in Cladocera; one strain of Daphnia gave origin to a second case of sex-intergrading; most female intergrades with chiefly male secondary characters proved sterile. Blakeslee reported on two yellow-coned variants in *Rudbeckia hirta*, one turning black, other crimson with KOH, which gave purple F_1, with appearance again in F_2 of the two yellows. In *Datura stramonium* he found new mutants; the "Globe" mutant has not been found pure-breeding; previously described form with slit corollas and leaves impressed its characteristics on cions of normal type and abnormality is suspected as bacterial; one mutant found incapable of crossing with original type. In Portulaca, Blakeslee reported vegetative segregations and Mendelian nature of doubling, the heterozygous semi-doubles giving full doubles (homozygous), semi-doubles and singles. Harris has secured seven lines of beans yielding only abnormal offspring. He has investigated relation between ovules per pod and fertility, and between number of pods per plant and individual seed-weight in beans. Blakeslee and Harris found a marked inverse correlation between egg-laying ability and yellow ear-lobes in White Leghorns. Davenport's studies on traits of naval men resulted in formation of new criteria for selection of officers; it is asserted that strong inclination toward sea is dependent on recessive factor.—*J. P. Kelly.*

873. DAVENPORT, C. B. **The feebly inhibited.** *8vo, 158 p. 86 fig.* Carnegie Inst., Washington, Washington, D. C., 1915.—Abstract by Y. Le Lay in Scientia 24: 64. 1918.

874. Dawson, E. Rumley. **The causation of sex in man.** *2nd ed. 8vo, xiv 226 p. 21 fig.* Lewis & Co.: London, 1917.—Abstract by J. Arthur Thompson in Scientia **24:** 61–62. 1918.

875. Drinkwater, H. **A second brachydactylous family.** [Review by H. W. Siemens, from Jour. Genetics **4:** 323. *pl. XI–XV, fig. 3.* 1914–1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19:** 96. Mar., 1918.

876. East, E. M. **Intercrosses between self-sterile plants.** Mem. Brooklyn Bot. Gard. **1:** 141–153. July, 1918.—Data are reported concerning the cross-sterility and cross-fertility of 53 F_1 hybrids from *Nicotiana Forgetiana* and *Nicotiana alata*, two species in which self-incompatibility in fertilization appears to be strongly developed. In all, 103 reciprocal matings were made from which it was found that the population fell into classes. Each member of a class was cross-sterile with every other member, but was cross-fertile with every member of other classes. Three classes were well defined with 22, 16 and 12 individuals, respectively; two classes contained but one individual each; presence of a fifth class was suggested by behavior of a single plant.

These results are explained in terms of Mendelian factors assumed to be directly concerned with compatibility. Author adheres to doctrine, often announced previously, that incompatibility in such cases is due to "similarity" of constitution and that compatibility is due to "dissimilarity" of constitution. It is recognized however, as has frequently been pointed out for similar cases, that pollen grains of a plant appear to act quite alike independently of any segregation of hereditary factors in reduction divisions concerned with their formation. It is stated that reciprocal crosses always gave same results and that self-fertilization in these plants increases cross-incompatibility among plants of subsequent generations.

It is reported that self-sterility (and cross-sterility as well) of a plant may decline toward end of flowering period, to such degree that plant may become self-fertile, a condition which is called "end-season pseudo-fertility."

All data presented in this paper are given in same detail, together with other data and with more extended discussion, in another paper which precedes as to date of publication (Genetics **2:** 505–609. Nov., 1917).—*A. B. Stout.*

877. Emerson, R. A. **A fifth pair of factors, Aa, for aleurone color in maize, and its relation to the Cc and Rr pairs.** Mem. Cornell Univ. Agric. Exp. Sta. 16. *23 × 16 cm., 231–289 p.* Cornell Univ., Ithaca, N. Y., Nov., 1918.—A pair of factors, *Aa*, such that aleurone color develops only in the presence of *A* in addition to *C*, *R* and *ii*, is announced to account for 27 : 37 F_2 ratios of colored to colorless aleurone. Hypothesis regarded as substantiated by following tests: (1) Colored F_2's shown to be of four classes resulting in F_3 ratios of 1 : 0, 3 : 1, 9 : 7 and 27 : 37 in approximately the relation of 1 : 6 : 12 : 8, respectively, and (2) colorless F_2's bred true in F_3 and shown to consist of the seven classes, *aCR*, *AcR*, *ACr*, *Acr*, *aCr*, *acR* and *acr*. Use of *aCR*, *AcR*, and *ACr* in testing for aleurone-color factors is explained and illustrated. Effect on aleurone color of degree of maturity and of color, composition and texture of underlying endosperm is discussed and influence of previously unannounced genetic factors noted. Heterozygous mottlings of aleurone is due to *Rr* pair and seen only when *R* is contributed by male and *r* by female, resulting aleurone *rrR*, self color appearing in reciprocal cross, aleurone *RRr*. Various hypotheses are noted as possible interpretations. Anomalously colored seeds, part colored and part colorless, are rarely if ever due to *Rr* pair, but frequently to *Cc* or *Aa* pairs and then only when dominant factor is contributed by male and recessive by female. Hypotheses involving vegetative segregation, somatic mutation and aberrant chromosome behavior discussed as possible interpretations.—*R. A. Emerson.*

878. Fischer, E. **Zur Frage der Vererbung der Empfänglichkeit von Pflanzen für parasitische Pilze.** [On the question of inheritance of the susceptibility of plants to parasitic fungi.] [Review by E. Schiemann, from Mitt. Nat. Ges. Bern für 1916, Mykol. Beitr. 8: 144–156. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. **19:** 136–138. Mar., 1918.

879. FLEISCHER, BRUNO. **Über myotonische Dystrophie.** [Abstract by Kurt Mendel, from Münchener med. Wochenschr. 1917.] Neurol. Centralbl. **1918**: 126, Feb., 1918.

880. GÖBELL, RUDOLF, AND WERNER RUNGI. **Eine familiäre Trophoneurose der unteren Extremitäten.** [Abstract by Kurt Mendel, from Archiv f. Psych. **57**[2]: 1917.] Neurol. Centralbl.] **1918**: 121. Feb., 1918.

881. GOODALE, H. D. **Internal factors influencing egg production in the Rhode Island Red breed of domestic fowl.** Amer. Nat. **52**: 65–94, 209–232, 301–321. *17 fig.* Feb.–Mar., Apr.–May, June–July, 1918.—Starting with the assumption that the egg-record of a hen "expressed as a given number of eggs per unit of time, and taken by itself, is not a sufficient measure or description of egg production, even under favorable environment," author proceeds to inquire regarding influence or interaction of number of external and of innate factors, such as rate of growth, bodily maturity, stamina, cessation of growth, sexual maturity, age at first egg, cycles, molt, rate and rhythm of production, and Pearl's genetic factors L_1 and L_2. In turn each of these factors is analyzed and discussed. *Conclusions, based upon four* years' study of production in Rhode Island Red breed, may be summarized as follows: *(1)* Date of first egg depends on time of hatching and rate of growth. On average, hens laying early in fall lay more winter eggs than those that begin later. *(2)* On average, pullets that lay early in life (6 to 7 months) lay more eggs than those that lay at 8 or 9 months. Variability in age at first egg was greater for Goodale's than for Pearl's stock. *(3)* Birds that lay rapidly lay more eggs than birds that lay slowly; and birds that lay late in fall lay more than those that stop early. *(4)* Some pullets lay continuously for long periods while others lay rapidly, but in cycles with period of rest between. In Goodale's Reds a "winter cycle," comparable to that found by Pearl in Barred Rocks, was absent "in a large percentage" of hens. Curves of winter production are shown to be compound curves. *(5)* Small birds mature earlier than large ones and therefore usually lay more winter eggs. Birds of poor stamina however, though sometimes making good records, usually manifest delay in appearance of first egg and hence give lower winter records. *(6)* Author regards fecundity as unsatisfactory character upon which to study effects of selection because character is complex and not simple unit character. Genetic constitution of Goodale's stock, with reference to Pearl's fecundity factors (L_1 and L_2 was not made out with certainty, but author believes that his Reds fall into Pearl's class of high producers. *(7)* Concludes by saying that knowledge of factors determining production is of importance from both commercial and biological standpoint. Biologically problem must be attacked from viewpoint that fecundity in fowls is not simple character but extremely complex.—*P. B. Hadley.*

882. GREGORY, R. P. ***On variegation in Primula sinensis.*** [*Abstract* by E. Lehmann, from Jour. Genetics **4**: 305–322. 1915.] Zeitschr. Bot. **10**: 133–137. 1918.

883. HAECKER, VALENTIN. **Über Gedächtnis, Vererhung und Pluripotenz. [On memory, heredity and pluripotence.]** [Review by Georg Sommer. In Zeitschr. indukt. Abstamm. u. Vererb. **19**: 91–94. Mar., 1918.] *97 p. 14 fig.* G. Fischer: Jena. 1914.

884. HARRIS, J. ARTHUR. **Further studies on the inter-relationship of morphological and physiological characters in seedlings of Phaseolus.** Mem. Brooklyn Bot. Gard. **1**: 167–174. July 6, 1918.—Seedlings of navy bean, morphologically aberrant in having cotyledons vertically separated, are compared with normal seedlings in respect to *(a)* mean green weight, *(b)* mean dry weight and *(c)* percentage of dry matter present in primordial and first compound leaves. Normal and abnormal seedlings were grown in pairs under rigid control and samples of leaves were taken from plants in lots of 100. Data are given for 23 (4,600 plants) such samples. Values show clearly that "abnormal plants produce relatively as well as absolutely less dry matter than normals." Morphological variation is associated with physiological differentiation.—*A. B. Stout.*

885. HARRIS, J. A. **Further studies on the relationship between bilateral asymmetry and fertility and fecundity in the unilocular fruit.** [Abstract by Cyril West, from Genetics **2**:

186–204. 1917.] Physiol. Abst. 3: 355. Sept., 1918. See also Exp. Sta. Rec. 38: 29. Jan., 1918.

886. Harris, J. A. **Supplementary determinations of the relationship between the number of ovules per pod and fertility in Phaseolus.** [Abstract by Cyril West, from Genetics 2: 282–290. 1917.] Physiol. Abst. 3: 355. Sept., 1918. See also Exp. Sta. Rec. 38: 29. Jan., 1918.

887. Harris, J. A. **On the applicability of Pearson's biserial r to the problem of asymmetry and fertility in the unilocular fruit.** [Abstract by Cyril West, from Genetics 2: 205–212. 1917.] Physiol. Abst. 3: 355. Sept., 1918. See also Exp. Sta. Rec. 38: 29. Jan., 1918.

888. Harrison, J. W. H. **Studies in the hybrid Bistoninae.** [Abstract by J. F. van Bemmelen, from Jour. Genetics 6: 95–161. *4 pl.* 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 124–125. Mar., 1918.

889. Hayes, H. K. **Natural cross-pollination in wheat.** Jour. Amer. Soc. Agron. 10: 120–122. 1918.—Three out of fifty pedigree cultures of wheat supposed to be pure lines, but which had been exposed to natural crossing, showed hybridity by Mendelian segregation. Further observation revealed other evident cases, all of which leads to conclusion that either conditions were unusually favorable for natural crossing or else this occurs much more frequently than has been generally supposed to be the case.—*L. H. Smith.*

890. Hayes, H. K. **Normal self-fertilization in corn.** Jour. Amer. Soc. Agron. 10: 123–126. 1918.—Describes experiment in which yield of corn was reduced more than 50 per cent. first year following self-fertilization. Experiment to determine amount of self-fertilization occurring under normal field conditions, by interplanting varieties of different-colored kernels, indicated less than 5 per cent. self-pollination.—*L. H. Smith.*

891. Hayward, P. S. **A new hybrid lily.** Gard. Chron. 64: 107–108, 148. 1918.—A new hybrid between the *auratum* and *speciosum* groups of lilies, superseding *L. Parkmannii* in point of interest on account of the rareness of this cross. New hybrid differs from *L. Parkmannii* in "form, petal and colouring."—*M. J. Dorsey.*

892. Heilig, M. **Über Beziehungen zwischen klinischem und histopathologischem Befund bei einer familiären Erkrankung des kindlichen motorischen Systems.** [Abstract by Kurt Mendel, from Arch. f. Psych. 57^3. 1917.] Neurol. Centralbl. 1918: 119. Feb., 1918.

893. Henkemeyer, A. **Untersuchungen über die Spaltungen von Weizenbastarden in der F_2 und F_3 Generation.** [Investigations on the splitting of wheat hybrids in F_2 and F_3 generations.] [Review by G. v. Ubisch, from Diss. Göttingen. *8vo, 32 p.* 1915.] Zeitschr indukt. Abstamm. u. Vererb. 19: 139–140. Mar., 1918.

894. Heribert-Nilsson, N. **Eine Mendelsche Erklärung der Verlustmutanten.** [A Mendelian explanation of loss mutations.] [Review by E. Baur, from Ber. Deutsch. Bot Ges. 34: 870. 1917.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 90–91. Mar., 1918.

895. Heymann, Adolf. **Zur Lehre von der partiellen Myotonia congenita.** [Abstract by Kurt Boas, from Inaug.-Dissert. Kiel, 1917.] Neurol. Centralbl. 1918: 125. Feb., 1918.

896. Higier, H. **Eine seltene Form von Epilepsie bei drei Brüdern (Epilepsie myoclonica Unterricht-Lundborg-J.** 'Author's abstract from Ber. d. Warschauer ärztl. Ges. *112* 1916.] Neurol. Centralbl. 1918: 120. Feb., 1918.

897. Hübner, A. H. **Über Myotonie.** [Abstract by Kurt Mendel, from Deutsche Zeitschr. f. Nervenheilk. 57^{3-6}. 1917.] Neurol. Centralbl. 1918: 125. Feb., 1918.

898. HUMBERT, E. P. **A striking variation in Silene noctiflora.** Bull. Torrey Bot. Club 45: 157–158. Apr., 1918.—Describes seedlings with 3 cotyledons and with divided cotyledons.—*J. A. Harris.*

899. IKENO, S. **Studies on the hybrids of Capsicum annuum. Part II. On some variegated races.** [Abstract by E. Lehmann, from Jour. Genetics 6: 201–230. 1916.] Zeitschr. Bot. 10: 133–137. 1918. See also Exp. Sta. Rec. 39: 123. Aug., 1918.

900. IKENO, S. **A note to my paper on some variegated races of Capsicum annuum.** [Abstract by E. Lehmann, from Jour. Genetics 6: 315–316. 1916.] Zeitschr. Bot. 10: 133–137. 1918.

901. ISHIKAWA, MITSUHARA. **A list of the number of chromosomes.** [Review by G. Tischler, from Tokyo Bot. Mag. 30: 404–448. *32 fig.* 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 125–126. Mar., 1918.

902. JEFFREY, E. C. **Hybridism and the rate of evolution in angiosperms.** [Review by E. Baur, from Amer. Nat. 50: 129–143. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 134. Mar., 1918.

903. JONES, L. R. **Disease resistance in cabbage.** Proc. Nation. Acad. Sci. 4: 42–46. 1918.—Most destructive disease of cabbage is "yellows," caused by soil-inhabiting fungus (*Fusarium conglutinosus*) which invades root system. It may persist indefinitely in soil which is called "cabbage sick."—Investigation of disease and its control was begun in Wisconsin in 1910. In most diseased fields some normally developed plants were found. Some were of best commercial type and fifty resistant plants were selected. Seed was grown and in 1912 each head strain was planted separately on "sick" soil. Commercial strains were planted as controls.—Poorest of selected strains proved decidedly superior to best of controls. Seed was grown from best of selected strains and planted in 1914. Best selected strain yielded 18.8 tons per acre against 2.1 tons for average of controls.—This strain has been distributed under name "Wisconsin Hollander."—The behavior of the organism causing disease was worked out by W. H. Tisdale by using flax wilt as basis, since cabbage is slow-growing plant to work with. Secondary studies with cabbage, while not complete, indicate general likeness in behavior.—In susceptible plant the organism penetrates directly to vessels and then ramifies through them. In resistant plants invasion is much slower and before it reaches vessels corky layer is formed which permanently walls off organism.—Crossing highly susceptible with resistant strains show resistance has tendency to be dominant. Indications are that it is dependent on several heritable factors.

J. C. Gilman found "critical soil temperature" for invasion of plant to be 17°C. Below this plants are not attacked even in sickest soils while for some 10°C. above this, attack becomes progressively more virulent.—In field trials strains resistant in Wisconsin have proved similarly resistant from New Jersey to Iowa. Investigations with other varieties at Wisconsin and also in Ohio, Iowa and Maryland have given encouraging results and indicate resistant strains can be secured from any vigorous variety. [See Bot. Absts. 1, Entry 321. Also see Physiol. Absts., 3: 305. July–Aug., 1918.]—*Karl Kurtzweil.*

904. KEARNEY, THOMAS H., AND WALTON G. WELLS. **A study of hybrids in Egyptian cotton.** Amer. Nat. 52: 491–506. *3 fig.* Oct.–Nov., 1918.—Preliminary study of crosses between varieties belonging to same general type of Gossypium. Less variable Puna and more variable Gila (differ chiefly in size and shape characters) gave practically no dominant in F_1 and unimodal distributions in F_2. Back-crossing F_1 twice with either parent obliterated expression of character of other parent.—Characters not correlated physically or physiologically are transmitted independently. F_2 and F_3 were not more variable than Gila and but slightly more variable than Puna.—*R. J. Garber.*

905. KIESSLING, L. **Untersuchungen über die Vererbung von Stickstoffgehalt und Korngrosse der Zweizelligen nickenden Gerste.** [Investigations on the inheritance of nitrogen con-

tent and size of grain in two-rowed nodding barley.] [Review by E. Schiemann, from Zeitschr. Pflanzenzüchtung 3: 81–147. Sept., 1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 141. Mar., 1918.

906. Kiessling, L. **Über die Streifenkrankheit der Gerste als Sorten und Linienkrankheit. [On the striping-disease of barley as a varietal and racial disease.]** [Review by E. Schiemann from Fühlings Landw. Ztg. **65**: 537–549. Sept., 1916.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 141–142. Mar., 1918.

907. King, Helen Dean. **Studies on inbreeding. III. The effects of inbreeding with selection, on the sex ratio of the albino rat.** Jour. Exp. Zool. 27: 1–35. *1 fig.* Oct., 1918.—Selection of breeding females from litters containing excess of males increased sex ratio (number of males per 100 females) from norm of 105 to 122.3 when females were mated to litter brothers, and to 115.6 when females were mated to unrelated males. Selection of breeding females from litters containing excess of females reduced sex ratio to 81.8 when females were mated to litter brothers, and to 91.1 when females were mated to stock males. Effect of selection reaches its maximum in first generation, and was not cumulative. Mating stock females to males from series selected for high and low sex ratio resulted in both cases in a reduced sex ratio, but the reduction was greater when males came from series selected for low sex ratio. In either case reduction was small, to 102.3 and 96.2 respectively, and may not be significant. Alteration of sex ratio is thus most easily affected by selection of females. Inbreeding did not of itself change the sex ratio to any extent. Author believes selection affects egg metabolism in such way as to render eggs more easily fertilized by male- or female-producing spermatozoa.—*A. F. Shull.*

908. Koch, Carl. **Ein Fall einer Kombination von progressiver Muskelatrophie mit Myotonie.** [Abstract by Kurt Mendel, from Ber. aus d. Abt. f. Kriegsneur. d. k. k. Reservespitales Nr. 3 in Laibach. Sept., 1917.] Neurol. Centralbl. **1918**: 126. Feb., 1918.

909. Kooy, F. H. **Über einen Fall von Heredodegeneratio, Typus Strümpell, bei Zwillingen.** [Abstract by Kurt Mendel, from Deutsche Zeitschr. Nervenheilk. 57^{1-6}. 1917.] Neurol. Centralbl. **1918**: 122. Feb., 1918.

910. Kretschmer, Ernst. **Über eine familiare Blutdrüsenerkrankung.** (Abstract by Kurt Mendel, from Zeitschr. Ges. Neurol. u. Psych. 36^{1-2}. 1917.] Neurol. Centralbl. **1918**: 118. Feb., 1918.

911. La Marca, F. **Un nouvel hybride de greffe. [A new graft-hybrid.]** Compt. rend. Paris, **166**: 647–649. 1918.—Describes graft hybrids appearing on 40-year old olive trees located in Caserta province, Italy. Graft belonged to variety Cannellina which produces ivory-white fruit at maturity while stock belonged to the variety Caiazzana which produces black fruit. Three of grafted trees bore both ivory-colored and black fruit. On one tree black fruit appeared at summit and at periphery, on second tree at end of sprout which grew perpendicularly from extremity of old branch, while third was from one of three boughs growing from same point.

Great diversity of coloration convinced observer that asexual hybridization was cause, and suspected hybrid was compared with varieties of Cannellina and Caiazzana. Comparison of stones, relation of equatorial and longitudinal breadth of same, leaf shape, peduncle of drupes, as well as analyses of oil showed hybrid to be different from parental varieties used for stock and graft. For many of these characters the suspected graft hybrid was intermediate.—Same phenomenon verified for four successive seasons convinced author that "asexual hybridization" actually was the cause. [See Physiol. Absts. **3**: 293. July–Aug., 1918. Also, Jour. Roy. Microsc. Soc. **1918**: 318. Sept. 1818. Also, Exp. Sta. Rec. **39**: 447. Oct., 1918.]—*H. K. Hayes.*

912. Loeb, J. **Further experiments on the sex of parthenogenetic frogs.** Proc. Nation. Acad. Sci. **4**: 60–62. 1918.—Twenty normal frogs of full size have been raised from artificially

parthenogenetic eggs, development being induced by method of puncture. Nine are still alive. Sex of nine others has been ascertained at age of 10 to 18 months, seven being males, two females. One male was examined cytologically, found to have diploid number of chromosomes. Possibilities for chromosome number in female are discussed. [Abstract by W. D. Halliburton in Physiol. Abst. 3: 328. Sept., 1918. See also Jour. Roy. Microsc. Soc. 1918: 290. Sept., 1918.]—*A. F. Shull.*

913. LONGMAN, H. A. AND C. T. WHITE. **Mutation in a proteaceous tree.** Proc. Roy. Soc. Queensland 30: 162–165. *Fig. 22.* Oct. 11, 1918.—In *Buckinghamia celsissima* normal flower has at base of pistil a crenulate gland. Several hundred flowers from specimen in Brisbane Botanical Garden showed this gland cut into 4 or 5 segments in nearly all, with 2 of these segments elongated into noticeable style-like processes that had no enlargement basally. Investigation revealed that seed parent of this specimen had same pair of processes in its flowers. Other trees were found that showed small percentage of such exceptional flowers.—*James P. Kelly.*

914. LOVE, H. H., AND W. T. CRAIG. **The relation between color and other characters in certain Avena crosses.** Amer. Nat. 52: 369–383. Aug.–Sept., 1918.—Results of several years' study of cross *Avena fatua* × *Avena sativa* var. Sixty Day, which closely resemble forms used by Surface. *Avena fatua* is brown or black, with both grains of spikelets awned and pubescent and has typical wild type of base, surrounded by tuft of basal hairs. Sixty Day is yellow, seldom awned and has no dorsal hairs, but may have an occasional basal hair. Parent and F_1 plants were grown in greenhouse, later generations in field. F_1 was generally intermediate-color, lighter brown than wild type, large grain of spikelet often awned and covered with dorsal hairs, small grain of spikelet never awned but with occasional dorsal hairs, base more like *sativa*, yet intermediate with some basal hairs at either side but not at back. F_2 gave several types, some resembling P_1, also other types different in color, amount of awning, pubescence, and the like. Color types were black, gray and yellow. The black oats were all more or less pubescent and the grays either pubescent or smooth. Both blacks and grays were awned, partially awned, or awnless. But the yellow oats were all smooth and entirely or nearly awnless, none possessing strong awns of wild type and none having more than 30 per cent. of awns, whereas blacks and grays were distributed throughout entire range from awnless to fully awned. This indicates some relation between yellow color and lack of awns.—Similar but less definite evidence of apparent inhibition of awning produced by yellow color was discussed by Nilsson-Ehle.—Assuming that *fatua* carries genes for black gray and yellow, segregation of 12 black : 3 gray : 1 yellow would be expected. Proportion of blacks to non-blacks was fairly close to 3 : 1, but difficulty of distinguishing pale grays from yellows caused considerable deviation in gray and yellow classes. It is very significant that there are no smooth blacks. The grays segregated as to pubescence on what may be a 1 : 2 : 1 ratio. No pubescent yellows have been obtained. Apparently there are two factors for pubescence, one linked with black, the other independent of any color factor.—In type of base the sucker-mouth shape of *sativa* is dominant or partially so to wild type, giving in this and other crosses 3 : 1 ratio, except in yellow oats which are all of *sativa* class. Thus some factor or factors related to yellow color inhibit production of wild type of base.—Data from three F_3 families exhibiting segregation similar to that obtained in F_2 substantiate inferences drawn from F_2 data, segregation as to color being clearly 12 black : 3 gray : 1 yellow. Segregation as regards pubescence and type of base agrees closely with that of F_2.—Three other F_3 families came from F_2 plants which were black, pubescent on one grain, and nearly awnless. Combined data gave classes, 231 black with one grain pubescent : 88 yellow smooth. This further substantiates statement that a pubescence factor is linked with black color factor.—In general there is very definite relation between color of glumes and production of awns. Form of *fatua* used here had two factors for pubescence, while in cross between *Avena fatua* and *Avena sativa* var. Tartar King, there were two types of *fatua* involved, one giving 15 : 1 ratio, other, 3 : 1 ratio. Latter type of *fatua* crossed with Sixty Day produced only smooth non-blacks, showing that this form has pubescence factor closely linked with black color gene.—Assuming *Avena fatua*

to be represented by *BBGGYYPP*, where *B* is factor for black; *G*, for gray; *Y*, for yellow; *P*, for pubescence; formula for Sixty Day becomes *bbggYYpp*; and *Y* inhibits pubescence in absence of *B* or *G*. This is the most reasonable explanation in view of data from other crosses. Facts in F_2 and F_3 tend to substantiate this hypothesis. In addition there is good evidence for existence of distinct strains within same variety of oats. Inhibiting effect of yellow on awns, pubescence and base, is not general for yellow oats.—*E. B. Babcock.*

915. McQueen, E. N. **The distribution of attention.** *8vo, 142 p.* University Press, Cambridge, England, 1917. [Abstract by Y. Le Lay.] Scientia **24**: 64–65. 1918.

916. Meade, Rowland M. **Bee keeping may increase the cotton crop.** Jour. Heredity **9**: 282–285. *fig. 16–17.* Oct., 1918.—Percentage of cotton flowers developing mature bolls is generally low. This is found to be case even in California, where boll weevil is absent and water is furnished by irrigation. There is good reason for supposing that lack of fertilization is important factor in this connection. Certain forms in which pistils are short, usually become self-pollinated; but flowers with long pistils are dependent on insects, at least to great extent. Experiments were made at San Antonio, Texas, in which plants were artificially pollinated. Percentage of bolls produced was materially increased. It is therefore suggested that bee-keeping in vicinity of cotton-fields, especially when cotton is of long-stapled type with long-exserted pistils, may be distinctly advantageous. Pollen of cotton is of such nature that it is not carried by wind.—*T. D. A. Cockerell.*

917. Miles, Frank C. **A genetic and cytological study of certain types of albinism in maize.** [Review by Tine Tammes, from Jour. Genetics **4**: 193. 1914–1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 142–143. Mar., 1918.

918. Miles, Frank C. **A genetic and cytological study of certain types of albinism in maize.** [Abstract by E. Lehmann, from Jour. Genetics **4**: 193–214. 1915.] Zeitschr. Bot. **10**: 133–137. 1918.

919. Naegeli. **Über Myotonia atrophica.** [Abstract by Kurt Mendel, from Münchener med. Wochenschr. 1917[51].] Neurol. Centralbl. **1918**: 126. Feb., 1918.

920. Naville, F. **L'idiotie amaurotique familiale de Tay-Sachs.** [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. **1**[1]. 1917.] Neurol. Centralbl. **1918**: 122. Feb., 1918.

921. Naville, F. **Étude anatomique du névraxe dans un cas d'idiotie familiale amaurotique de Sachs.** [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. **1**[1]. 1917.] Neurol. Centralbl. **1918**: 123. Feb., 1918.

922. Nilsson-Ehle, H. **Gibt es erbliche Weizenrassen mit mehr oder weniger vollständiger Selbstbefruchtung? [Are there hereditary races of wheat with more or less complete self-fertilization?]** [Review by E. Schiemann, from Zeitschr. f. Pflanzenzüchtung **3**: 1–6. Sept., 1918.] Zeitschr. f. indukt. Abstamm. u. Vererb, **19**: 140–141. Mar., 1918.

923. Ortlepp, Karl. **Monographie der Füllungserscheinungen bei Tulpenblüten. [Monograph of the phenomena of doubling in tulip blossoms.]** [Review by E. Lehmann, of book. Leipzig, 1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 143–144. Mar., 1918.

924. Peltier, Geo. L. **Susceptibility and resistance to citrus-canker of the wild relatives, citrus fruits and hybrids of the genus Citrus.** Jour. Agric. Res. **14**: 337–358. Aug., 1918.—Author attempts to determine susceptibility and resistance to citrus-canker (caused by *Pseudomonas citri* Hasse) of wild relative of citrus and certain more obscure species, varieties and hybrids. Methods of inoculation on young vigorous plants were carefully controlled and all forms subsequent to inoculation were grown at relatively high temperatures in cases in the greenhouse where practically 100 per cent. humidity was maintained. Relative sus-

ceptibility of different forms under experiment was judged according to number, size, and character of leaf spots. Material was made available by the United States Department of Agriculture.

The inoculation tests show that the "Citrus-canker" is apparently limited to those plants having edible fruits with stalked pulp vesicles of the subtribe Citrinae which includes the genera, Poncirus, Fortunella, Eremocitrus, Citrus, and Mirocitrus. Of citrus relatives, Fortunella, Eremocitrus, and Mirocitrus show some resistance to this canker while Poncirus is extremely susceptible. All species and varieties of citrus tested are susceptible, although some forms as the varieties of *C. nobilis*, the Kansas orange and "possibly" *C. milis* showed some resistance.

From genetic standpoint, relative susceptibility of certain hybrids is important. When both parents are susceptible the hybrid shows some susceptibility. When one parent is resistant hybrid "retains to a large extent" resistance of resistant parent. Hybrids between two resistant parents were not available for test.—*M. J. Dorsey.*

925. PUNNETT, R. C. **Studies in cereal-breeding.** Gard. Chron. **64**: 180. Oct. 12, 1918.—Abstract of three papers on oat and wheat crosses by A. St. C. Caporn., in Journal of Genetics, August, 1918. [See Bot. Absts. 1, Entries 866, 867, 868.]

926. PUNNETT, R. C. **Reduplication series in sweet peas.** [Review by Tine Tammes, from Jour. Genetics 3: 77. 1913–1914.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 143. Mar., 1918.

927. RABAUD, ETIENNE. **"Dislocated" mice.** [Abstract from Bull. Soc. Zool. France, 42: 87–97. *1 fig.* 1917.] Jour. Roy. Microsc. Soc. **1918**: 33. Mar., 1918.

928. ROBERTS, ELMER. **Fluctuations in a recessive Mendelian character and selection.** Jour. Exp. Zoöl. 27: 157–192. *2 pl., 3 fig.* Nov. 20, 1918.—Thirty-four generations of selection for length of wing effected no recognizable change in a strain of Drosophila with vestigial wings. After crossing with normal wild stock, significant increase in size of wings was found among vestigial segregates. Increase was greater in males than in females. Thirty-two generations of selection produced no further change. Much of variation was found to be due to temperature, males being more easily affected than females.—*Sewall Wright.*

929. ROSENBERG, O. **Die Reduktionsteilung und ihre Degeneration in Hieracium. [Reduction division and its degeneration in Hieracium.]** [Review by G. Tischler, from Svensk. bot. Tidskr. 11: 145–206. *26 fig.* 1917.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 130–132. Mar., 1918.

930. SAHLI, G. **Die Empfänglichkeit von Pomaceenbastarden, Chimären und intermediären Formen für Gymnosporangien. [Susceptibility of Pomaceous hybrids, chimaeras, and intermediate forms to Gymnosporangia.]** [Review by E. Schiemann, from Centralbl. Bakt. II, 45: 264–301. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. *19: 136–138.* Mar., 1918.

931. SCHAXEL, J. **Über den Mechanismus der Vererbung. [On the mechanism of heredity.]** Review by M. Gerschler, of book. Fischer, Jena. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 89–90. Mar., 1918.

932. SHULL, A. FRANKLIN. **Relative effectiveness of food, oxygen, and other substances in causing or preventing male-production in Hydatina.** Jour. Exp. Zoöl. 26: 521–544. Aug., 1918.—Experiments with rotifers to test effect of saturation of culture water with air-oxygen mixtures, of which 40 or 60 per cent. was oxygen, upon ratio of male-producing females to female-producing females. (*1*) Six lots of rotifers subjected to 60 per cent. oxygen mixture were exposed to ordinary air conditions as control. Control showed total average of about 14 per cent. male-producing females while those treated with oxygen yielded an average of about 26 per cent, male-producing females. (*2*) 14 lots in air mixture yielded about 19 per

cent. male-producing females while in 60 per cent. oxygen mixture 11 lots yielded about 21 per cent. male-producing females and 3 lots yielded 54 per cent., thus averaging about 27 per cent. male-producing females. (3) 14 lots under air conditions yielded about 13 per cent. male-producing females, while 11 lots in 40 per cent. oxygen mixture yielded only about 6 per cent. but 3 lots yielded about 69 per cent. male-producing females, thus making total average of about 21 per cent. male-producing females, or about 8 per cent. higher than control. Higher total average of male-producing females in oxygenated lots seems to indicate that oxygen is potent factor in production of male-producing females. (5) Many tests to determine amount of oxygen in culture waters that were subjected to air, 40 per cent. and 60 per cent. of oxygen atmosphere, at beginning and at end of experiments, showed that those subjected to oxygen atmosphere always contained more oxygen than similar ones not subjected to oxygen. Manure scum decreased amount of oxygen in various culture waters while Euglena increased it. (6) Certain lots of rotifers were fed Euglena in non-oxygenated water, certain lots manure scum in oxygenated water, and other lots manure scum in non-oxygenated water, in order to determine influence of these agents in causing production of male-producing females. 20 lots fed Euglena yielded about 14 per cent. male-producing females. 20 lots fed manure scum yielded about 5 per cent. male-producing females. 18 lots fed manure scum in oxygenated water yielded only about 4 per cent.; while 2 other similarly treated lots yielded about 32 per cent. male-producing females, thus making total average of about 8 per cent.; which is about 3 per cent. of male-producing females higher than in preceding lots that received no oxygen treatment. Author concludes that Euglena increases male-producing female production about 9 per cent. above that of manure scum and that oxygen in manure scum increases male-producing female production about 3 per cent. above that in manure scum without oxygen treatment. Furthermore general conclusion is reached from this experiment that food is about twice as effective as oxygen in causing male-producing females to be produced. (7) Euglena in spring water yielded maximum percentage of male-producing females, while manure scum in manure solution yielded minimum percentage of male-producing females. (8) In two experiments with creatin, Euglena, manure scum, and spring water one experiment showed that effect of Euglena as food was nearly 17 times as effective as oxygen and other experiment only about 3 times as effective as oxygen, in increasing male-producing females. General conclusion of whole paper is that oxygen and food are factors which increase number of male-producing females but that food is several times as effective as oxygen in causing this increase.—*D. D. Whitney.*

933. Shull, A. Franklin, and Sonia Ladoff. **Factors affecting male-production in Hydatina.** [Abstract by M. Gerschler, from Jour. Exp. Zoöl. **21.** 1916.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 110–115. Mar., 1918.

934. Shull, A. Franklin. **Periodicity in the production of males in Hydatina senta.** [Abstract by M. Gerschler, from Biol. Bull. **28.** 1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 110. Mar., 1918.

935. Shull, George Harrison. **The duplication of a leaf-lobe factor in the shepherd's-purse.** Mem. Brooklyn Bot. Gard. **1**: 427–443. *4 figs.* July, 1918.—Author studied shepherd's-purse (*Bursa bursa-pastoris*) from many parts of world and found that rosettes in general are of four types previously reported, i.e., *heteris* (with leaf factors *AB*), *rhomboidea* (*aB*), *tenuis*, (*Ab*), *simplex* (*ab*). In previous papers extension of leaf lobing to midrib was ascribed to one gene *B*. Wild plants from Peking, Vicenza, Berlin, Landau (Germany), Groningen, Cardiff, Chicago, New Carlisle (Ohio), show this monomeric condition of "B"-lobing, as evidenced by approximate 3 to 1 F_2 ratios when parents with and without "B"-lobing are crossed. Shepherd's-purse of *heteris* type from Tucson, Arizona, proved exceptional; crossed with a *simplex* type it gave F_2 ratio of $B:b$ of 10.91:1. Another F_2 group of same origin gave F_2 ratio of 6.46:1 under conditions which tend to suppress dominant characters. 29 such F_2 plants with "B"-lobing gave in F_3, 19 families with "B"-lobing in all individuals, 3 families with about 15:1 ratio of *B* to *b*, and 7 families with approxi-

ıate 3:1 ratios; expected 14:8:8. Several of the 19 *B*-containing families contained small umbers. Author concluded that in Tucson type, duplicate genes *B* and *B'* determine "B" ype of lobing. Biotypes from Groningen, Bremen, Berlin, Cardiff, and probably Peking, lso have this dimeric "B"-lobing. Morphological complexity of character produced by *B* nd B'-factors indicate that duplication occurred through physical rearrangement of genoype rather than by repeated mutation, affecting in like manner chromosomes belonging to istinct pairs.—*J. P. Kelly.*

936. Siemens, Hermann W. **Das Erfindergeschlecht Siemens. [The Siemens family of ıventors.]** [Review by Fritz Lenz, from Archiv f. Rassen- u. Gesellschaftsbiol. **12**: 163–192.) eitschr. indukt. Abstamm. u. Vererb. **19**: 95. Mar., 1918.

937. Singer, Kurt. **Bemerkenswerter Fall von Thomsencher Krankheit.** [Abstract by urt Mendel, from Monatsschr. f. Psych. u. Neurol. **41**[4]. 1917.] Neurol. Centralbl. **1918**: 25. Feb., 1918.

938. Sommer, Robert. **Friedrich der Grosse vom Standpunkt der Vererbungslehre.** Abstract by Kurt Mendel, from Sommers Klinik f. Psych. u. nerv. Krankh. **10**[1]. 1917.] eurol. Centralbl. **1918**: 118. Feb., 1918.

939. Stout, A. B. **Experimental studies of self-incompatibilities in fertilization.** Proc. oc. Exp. Biol. and Med. **15**: 51–54. 1918.—Summary of previous publications on sterility ı *Cichorium Intybus.* Results obtained indicate (*a*) that self- and cross-incompatibilities re strongly in evidence in this species; (*b*) that self-compatible plants may arise sporadically om parents that are self-sterile even after three generations of self-incompatible ancestry; :) that the progeny of such plants do not breed true to this character; (*d*) that the degree of elf-compatibility varies greatly; (*e*) that selection for high degrees of self-fertility continued or four generations has not been effective in isolating a completely self-fertile strain. Selfompatibility and self-incompatibility are entirely independent of differences in vegetative igor; they operate independently of potential sex vigor; they may operate independently f the purely nutritive relations of embryos to their parent plants; they appear indepenently of any combination of germ-plasm elements in so far as these can be judged by the xpression of characters and their development occurs in both cross-bred and inbred races. esults obtained in chicory make it clear that self-incompatibility and self-compatibility re not to be described as dominant and recessive characters, or paired allelomorphs, and ıere is no simple Mendelian formula that fits the results. Evidence of similar phenomena ı other species considered to be quite in agreement with this conclusion. Factors conrolling sex fusions arise in connection with development of sex organs and sex cells as such nd are of epigenetic and individual development and are highly variable as to degree, pecificity, and transmission in heredity. Phenomenon appears to present some analogy o that of so-called antigen-antibody reactions in immunity, and to isoagglutination and oprecipitation phenomena.—*D. F. Jones.*

940. Stout, A. B. **Duplication and cohesion in the main axis in Cichorium Intybus.** Iem. Brooklyn Bot. Gard. **1**: 480–485. 1918.—Terms duplication and cohesion are used to esignate special type of fasciation of main axis observed in horticultural variety "redaved Treviso" of *Cichorium Intybus.* This differs from banded and cone types in that two em elements of equal size are clearly in evidence. Fasciation is confined to middle and ower portions of stem, main axis often becoming simple at its apex. Degree and extent of uplication are illustrated and described. Torsion is frequently seen. Phyllotaxy is disussed. Seedling abnormalities consisting in reduction or fusing of cotyledons or absence f plumule are described. Author concludes that character is strongly but not completely eritable. Wide variation in degree of duplication in different individuals, and wholly noral plants may occur. Duplication is incompletely dominant in F_1 generation of cross with ormal, both as to degree of expression and number of plants affected.—*J. A. Harris.*

941. Stargardt, K. **Über familiäre Degeneration in der Maculagegend des Auges mit und ohne psychische Störungen.** [Abstract by Kurt Mendel, from Arch. f. Psych. 58^{1-2}. 1917.] Neurol. Centralbl. **1918**: 122. Feb., 1918.

942. Straus, H. **Dominanz und Rezessivität bei Weizenbastarden.** [**Dominance and recessiveness in wheat hybrids.**] [Review by G. v. Ubisch, from Diss. Göttingen. *8vo, 38 p. 1 pl.* 1914.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 139. Mar., 1918.

943. Sumner, F. B. **Continuous and discontinuous variations and their inheritance in Peromyscus. III.** Amer. Nat. **52**: 439–454. Aug.–Sept., 1918.—Mutations in four geographical races of deer mice are described. (*1*) Partially albinic mutant strain with red eyes, no pigment on ears and tail and very pale gray fur, strongly tinged with shade of yellow, approaching "ochraceous buff" is called "pallid." Behaves as recessive to fully pigmented strain. Its complete segregation is in striking contrast to apparent lack of segregation in respect to sub-specific characters which entered into germinal constitution of these same individuals. Of forty-seven F_2 offspring obtained from mating of F_1 *P. sonoriensis rubidus*, four were "pallid." These were progeny of six different fathers and eleven different mothers. The four putative mutants were offspring of single father mated with two of his own sisters. These mothers, by same father, also produced seven dark young. Author believes that these "pallid" mice are true mutants, appearing *de novo* in his cultures and that it is probable that hybridization of such diverse strains was the disturbing element that led to loss or modification of a gene. (*2*) A yellow mutant from *P. maniculatus gambeli* have larger number of yellow-banded hairs, in proportion to those which are black throughout their entire length, and yellow zone of each hair, occupies on average, considerably larger proportion of its length. On mid-ventral surface, the basal, plumbeous zone is lacking, the hairs being entirely white. These "yellow *gambeli*" came from five parents normally-colored *Peromyscus maniculatus gambeli* (La Jolla race). They produced twenty-one offspring, fourteen of which were normal and seven "yellow *gambeli*." Their origin is uncertain. In inheritance they behaved as simple monohybrid recessives. "Yellows" bred to "yellows" have produced only "yellows." The "pallid" crossed with "yellow *gambeli*" produced one offspring with dark pigmented skin, hair and eyes, the two yellow mutants seeming to be complementary to one another, as were Castle's two yellow races of rats. (*3*) "Grizzled," a mutant distinguished by white hairs on face. These were discovered in second cage-born generation of *gambeli*. Three mice were found all having descended from same grandparents but not of single fraternity. Their parents and grandparents did not show the "grizzled" character. One specimen also was discovered in second cage-born generation of *P. m. sonoriensis*. "Grizzled" character is hereditary. (*4*) A caudal skin pigmentation of *P. rubidus* is a hereditary character. (*5*) White-tipped snout due partly to absence of skin pigment and partly to presence of white hair, appearing in dark race of *rubidus*, is monohybrid recessive mutant.

Author discusses inheritance and variation of these characters on basis of multiple factor hypothesis and of Castle's view of "potency of a unit factor." He states that burden of proof rests upon those who contend that continuous and discontinuous variation and inheritance are reducible to single category, that of discontinuity. "Anything like a proof of this contention appears to be rather lacking."—*B. O. Severson.*

944. Sutton, Arthur W. **"Rogues" among potatoes.** Gard. Chron. **64**: 142. Oct. 5, 1918.—Tubers of Jackson's new variety thought to have arisen by bud-mutation, were found by author to resemble Up-to-date. Quotation by Jackson from Darwin's *Variation of animals and plants under domestication*, chapter 11, p. 410, shows Darwin observed only bud variations in color of skin. Similar bud-mutations are known to all experienced growers. Examples cited are Old Rector of Woodstock which gave potato with skin mottled purple and white, and white sports of Fortyfold and Beauty of Hebron. Other characters of such variations are indistinguishable from original stocks. Bud-mutation of wild *Solanum commersonii* noted by M. Labergerie as giving rise to a large coarse-growing red or violet-skinned

potato was proved by the late M. Philippe Vilmorin and writer to be Blue Giant introduced by Polsen in Germany. Heckle's "mutations" raised from *Solanum commersonii* were also found to have arisen under unsuitably controlled conditions.—*H. K. Hayes.*

945. Sutton, Ida. **Report on tests of self-sterility in plums, cherries, and apples at the John Innes Horticultural Institution.** Jour. Genetics 7: 281–300. *3 fig.* Aug., 1918.—Horticultural and genetic study of self-sterility. No evidence found against the view that self-sterility is recessive. No satisfactory cases of failure to set fruit in cross-pollinations which could be surely attributed to cross-incompatibility. Out of many crosses made in the three kinds of fruit only four varieties of plums were found to be cross-sterile but two of these varieties known to have originated from one of the four by bud-mutation and the other is suspected of having similar origin. Varieties studied are classified as self-sterile, partly self-sterile and self-fertile. Tables of the pollinations made and their results are appended, together with three illustrations.—*D. F. Jones.*

946. Thomson, J. Arthur. **On sexual selection.** Scientia 24: 22–32. 1918.—Darwin's theory of sexual selection can no longer be accepted in precise form in which he stated it, but it appears that many of his postulates may still be considered wholly or partly valid. Unfortunately term had double meaning, first as applicable to any events connected with sex which gave certain individuals preference over others in respect to mating and production of young; and second, having to do with conscious choice or selection of certain males by females. Now as regards first and more general application of the term, no one who has faith in natural selection can doubt that this operates in special and important ways during the mating period. So-called sexual selection is here nothing more than phase of natural selection. When, however, we postulate a discriminating esthetic sense on part of females, sufficient to distinguish between variations appearing in males, our credulity is more seriously taxed. Author, after reviewing number of post-Darwinian publications dealing with subject, concludes that phenomena connected with courtship certainly produce reactions or emotional states, and that it is not necessary to suppose that females discriminate in esthetic or intellectual manner. Furthermore it can be shown that secondary sexual characters, having at first no significance apart from sex, frequently contribute to richness and variety of life and are thus double advantageous to the race.—*T. D. A. Cockerell.*

947. Trow, A. H. **On "albinism" in Senecio vulgaris L.** [Abstract by E. Lehmann, from Jour. Genetics 6: 65–74. 1916.] Zeitschr. Bot. 10: 133–137. 1918.

948. Tupper, W. W., and H. H. Bartlett. ***The relation of mutational characters to cell* size.** [Abstract by Cyril West, from Genetics 3: 93–106. 1918.] Physiol. Abst. 3: 355. Sept., 1918.—See Bot. Absts. 1, Entry 50.

949. Walton, L. B. **Organic evolution and the significance of some new evidence bearing on the problem.** Amer. Nat. 52: 521–547. *5 fig.* Oct.–Nov., 1918.—How hereditary character-forming genes were first called into existence, not evolution as a process, nor methods by which characters are inherited, is to-day the important biological problem. Author discusses various trends of genetical discovery and speculation, and states that critical students have not been convinced that environmental stimuli account for new genetic factors. Recurrent "mutations" and parallel mutations in different species cause one to distrust force of mutations in evolution; for one may well believe that any particular mutation under observation sufficiently long, will exhibit recurrent changes. Since differentiation of species in Drosophila may have taken place two, or more, millions of years ago, genes common to the two species *melanogaster* and *virilis* may have been preformed for long period of time. From studies of Lillie, Morgan, Woltereck and others on direct and indirect effects of changed metabolism, author concludes that heredity hands down frame-work which within certain limits allows plasticity in development, and that direction of development is determined by physico-chemical influences through suppression of potential units. He also con-

cludes that breeders are "largely, if not entirely, engaged in presenting new combinations of existing units," rather than in the discovery of production of new units. He then inquires whether there may not be evidence, even though circumstantial, which permits new insight, and suggests that turning of earth on its axis, causing sun to appear to move from east to west, may have brought negatively phototactic microorganisms of northern hemisphere to rotate as a rule in reverse, or counter-clockwise direction. With two exceptions, positively phototactic forms rotate clockwise in northern hemisphere. Reverse situation appears to prevail in southern hemisphere. The flagellum is assumed to be orienting organ which is affected by sun. Final conclusion reached is that primary factors of evolution are environmental and thus dynamic.—*R. K. Nabours.*

950. WESTPHAL, A. **Beitrag zur Lehre von der amaurotischen Idiotie.** [Abstract by Kurt Mendel from Arch. f. Psych. **58**[1-3]. 1917.] Neurol. Centralbl. **1918**: 122. Feb., 1918.

951. WEXBERG, E. **Eine neue Familie mit periodischer Lähmung.** [Abstract by Pilcz, from Jahrb. f. Psych. **37**: 1917.] Neurol. Centralbl. **1918**: 120. Feb., 1918.

952. WHITE, O. E. **Inheritance studies on castor beans.** Mem. Brooklyn Bot. Gard. *1: 513–521. 6 pl. July, 1918.—Data for F_1 and F_2 of crosses involving five pairs of characters,*—green, red blush, mahogany and rose stem colors, seed color patterns, and bloom,—indicate simple Mendelian inheritance. Dehiscent and indehiscent capsules are thought to involve two factor pairs. F_1 of small × large seeds intermediate, F_2 graded series from size of large parent to that of small parent or smaller. Extreme sizes and some intermediates of F_2 bred true while other intermediates exhibited different ranges of variation in F_3. Stature, season of maturity, leaf shape, and spike density were studied less fully. F_1 plants of some crosses showed increased seed production and of other crosses no increase over parents.—*R. A. Emerson.*

953. WINGE, Ø. **Studier over Planterigets Chromosomtal og Chromosomernes Betydning** [Review by G. Tischler, from Dissert. Kobenhavn. *143 p., 1 pl., 46 fig.* 1917.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 126–130. Mar., 1918.

954. WRZOSEK, ADAM, AND ADOLF MACIESZA. **Über die Entstehung, den Verlauf und die Vererbung der durch Rückenmarksverletzung hervorgerufenen Meerschweinchen-Epilepsie. [On the origin, the progress and inheritance of epilepsy, induced in the guinea-pig by injury to the spinal cord.]** [Review by H. W. Siemens, from Archiv. f. Rassen- u. Gesellschaftsbiol. **11**: 289. 1914–1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 109–110. Mar., 1918.

955. ZEDERBAUER, E. **Alter, Vererbung und Fruchtbarkeit. [Age, inheritance and fruitfulness.]** [Review by E. Schiemann, from Verh. k. k. zöol. bot. Ges. **61**: 81–87. 1917. *Zeitschr. indukt. Abstamm. u. Vererb. 19: 138–139. Mar., 1918.*

956. ZEDERBAUER, E. **Untersuchungen über das Gelingen von Bastardierungen zwischen ungleichalterigen Individuen von Pisum sativum. [Investigations on the success of hybridization between individuals of Pisum sativum of unlike age.]** [Review by E. Schiemann, from Zeitschr. f. Pflanzenzücht. **3**: 63–67. 1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 138. Mar., 1918.

HORTICULTURE

W. H. CHANDLER, *Editor*

[Unsigned abstracts are by the editor.]

957. ALDERMAN, W. H. **Experimental work on self-sterility of the apple.** Proc. Amer. Soc. Hort. Sci. **14**: 94–101. 1918.—This is a preliminary report on extensive work with the problem of the self-sterility in the apple, that the author and his associates are doing.—As

to the details of the work muslin frames were found to be a better covering for the blossoms to be studied than the ordinary paper bags. The set, however, of nearly self-sterile varieties was greater when the blossoms were isolated under paper bags than under the muslin frames. The varieties studied were Rome Beauty, York Imperial, and Wagoner.

During the progress of the work about one hundred and fifty thousand flowers have been pollinated and records have been kept of their subsequent behavior. Both Rome Beauty and York Imperial were found nearly self-sterile, but not entirely so. In the case of the Rome Beauty fertilized with Rome Beauty pollen, there was no greater set when the pollen was taken from a separate tree. This same is true of the York Imperial. As to the benefits of cross-pollination with Rome Beauty, the percentage of set was increased 3½ times, with York Imperial 14 times, and with Wagener 7 times, by cross pollination. Much fewer blossoms of Wagener were studied, however, than with the other varieties. The size of the fruit was increased 27.8 per cent. by cross pollination in the case of the Rome Beauty; 42.7 per cent. in case of Wagener.

Some data are presented which seem to indicate that the percentage of set is greater in the case of emasculated blossoms than in the case of blossoms not emasculated. The average number of seed found in self-fertilized Rome Beauty was 3.5; in cross-fertilized 7.1; in self-fertilized York Imperial 2.7; in cross-fertilized 7.0; in Wagener self-fertilized 1.06; Wagener crossed 6.88.

The author suggests this as an explanation of the greater size of the cross pollinated fruit. Germination tests showed that the pollen of the partially self-sterile varieties is viable, and also, that the pollen grains seem to germinate equally well in the stigmatic fluid of their own or other varieties. As a practical test of self-sterility in a Rome Beauty orchard, bees were placed in one section and blooming branches of other varieties were placed among the trees. The percentage of set in this section was 12.6 per cent. against 7.8 per cent. in the section where the trees bloomed equally well, but at the farthest side of the orchard from the bees.

Trees near a Ben Davis tree in the orchard gave 20 per cent. of set. On the following year the percentage of set was in the bees' section 8.3 per cent., in the check 4.3 and near the Ben Davis 15.9 per cent.

958. Breazeale, J. F. **The mulch basin system of citrus culture.** California Citrograph 3: 232. Aug., 1918.—A modification of the mulch basin system is recommended for citrus orchards as a means of reducing the cost of cultivation and conserving soil moisture and organic fertilizing materials. The scheme proposed consists in a combination of the trench and mulched basin systems, the organic materials for use in which to be grown as cover crops between the tree rows. No experimental evidence is offered.—*W. G. Kelly.*

959. Cruess, W. V. **Orange vinegar instead of apple produced here.** California Citrograph 3: 257. Sept., 1918.—Vinegar of good quality was made in a number of tests in the Citrus By-Products Laboratory of the U. S. D. A., Los Angeles. The process recommended is:—Press out juice from crushed whole fruit. Leave in barrel or wooden tub at about 85°F. until fermentation is complete (3–5 days). Strain the juice. Place in barrel generator previously acidified with unsterilized vinegar. Plans for barrel generator are given. When the vinegar is finished remove from barrel, bottle and pasteurize.—*W. V. Cruess.*

960. Dahl, A. L. **Where pineapples come from.** California Cultivator 51: 417. *Fig. 1.* Oct. 26, 1918.—The science of canning has made it possible for dwellers in every country to enjoy the pineapple in a high degree of quality. The pineapple grows wild in most tropical countries and is exported commercially from the West Indies, Bahamas and Hawaii. In the early 90's, millions of the fresh fruits were canned in Baltimore and a regular line of steamers was operated to carry the fruit from the West Indies. Although pineapple canning is still carried on at Baltimore, the greatest development of the industry has taken place in Hawaii where the packing plants represent the last word in cleanliness and efficiency. The industry has rapidly grown from a production of 2000 cases in 1901 to almost 3,000,000 cases in 1917.

The canning factories are now located mostly in Honolulu, the fruit being shipped not over twenty-two miles from the plantations. Details of the process of harvesting, preparation for canning, and the actual canning process are described.—*I. J. Condit.*

961. EATON, F. M. **Efficiency in citrus irrigation.** *16 p.* San Diego Land Corporation, Chula Vista, California, 1918.—In this paper, which was delivered as an address before the Synapsis Club at the Citrus Experiment Station, Riverside, the author summarizes some general considerations affecting citrus orchard irrigation in Southern California and appends an account of the method used by one large orcharding company in regulating the time between irrigations and the amount of water applied, on the basis of laboratory soil moisture determinations. The system used has for its basis the determination of the moisture equivalents and wilting coefficients of the different types of soil involved and an attempt is made to keep the soil moisture content as near the former as possible, it being deemed that this constant approximates the optimum moisture content. A full description of the apparatus used and methods pursued is given. Methods of furrowing as adapted to different soil types are considered. The contention is made that fully as many orchards suffer for lack of sufficient water as on account of over-irrigation. Some relations of the penetration of irrigation water and root distribution to irrigation practice are brought out. A coöperative system for a rational irrigation practice in citrus orchards is suggested.—*R. W. Hodgson.*

962. FLOYD, B. F. **Injury to citrus trees by the improper use of ground limestone.** Rept. of Plant Physiologist. Florida Agric. Exp. Sta. 1917: 35 R–46 R. May, 1918.—In pot experiments with citrus trees the presence of ground limestone produced a distinct injury characterized by two types of yellowing: (a) a frenching, or lack of green color in the areas between the largest veins, and (b) a chlorosis consisting of a more or less complete yellowing or whitening of the leaves. Both types had a quantitative relation to the limestone in the soil and more injury was induced in sandy soils than in loam soils. Both cottonseed meal and sulphate of ammonia, when applied to plants growing in soil containing no limestone, produced frenching but not complete chlorosis.—*R. D. Anthony.*

963. KINMAN, C. F. **The mango in Porto Rico.** Porto Rico Agric. Exp. Sta. Bull. 24. *30 p. Pl. XI.* Feb. 4, 1918.—The common mango of Porto Rico, which is one of the most important fruits of the island, is not cultivated but grows wild in all localities. Superior varieties lately imported have proved satisfactory and should be planted extensively for market and home use.—Mango trees are adapted to a wide range of soil types and will grow satisfactorily in practically all Porto Rican soils, provided there is a good subdrainage.—While the climate throughout the island is suitable for the growth of mango trees, in some localities, notably through the interior and along the northern slopes, rains are sometimes too frequent during the blossoming season to permit the setting of a good crop of fruit. Along the western and northern lowlands rainfall is light during the blossoming season and good crops are almost invariably secured.—As the prevailing winds and morning sun seem to be very beneficial, both for growth of trees and setting of fruit, open, exposed sites should be selected for the mango orchards.

Inarching and bark grafting, simple methods for asexual propagation, are satisfactory both for use in the nursery and for topworking large trees. The important conditions in grafting are that the stock be just starting a new growth, the scion mature, and the buds ready or almost ready to open.—Large seeds which produce only one plant are most satisfactory for stocks. The East Indian varieties produce larger and more thrifty plants, as a rule, than the native kinds. Both nursery and other mango trees may be transplanted successfully if they are not making a new growth and rainfall is plentiful.

The present confusion in the classification of types of mangoes, as well as the great variation in growth and productiveness of trees, and quality of fruit, necessitates a thorough study of varieties before a mango orchard can be successfully planted in Porto Rico.—Among a number of imported varieties that have fruited here, the most productive of the thrifty kinds with fruits of high quality are Cambodiana, Totafari, Amini, Bennett, and Paheri.

Cambodiana and Paheri are probably better suited to home than to commercial use.—The trees of the few varieties from Martinique, Trinidad, and South America thus far tested lack vigor, while the fruits are either inferior in quality or too small to be promising for general planting. As regards size, flavor, fiber content, and keeping quality, the wild Porto Rican mangoes are less desirable than many imported kinds.

In harvesting mangoes that have not softened on the tree, a stem longer than a fruit stalk should be left to prevent the juice from escaping through the fruit stalk and leaving passages for the entrance of infection.—Fruits in orange wrapping paper did not ripen or decay so quickly as those wrapped in oil paper, newspaper, or coconut fiber, or those left in the open air. Fruits packed in coconut fiber ripened earliest.—East Indian varieties showed much better keeping qualities than the native kinds.

The mango is one of the most satisfactory ornamental trees for Porto Rico, as variations in habits of growth and color of foliage make it possible to select from varieties producing fruit of high quality those which best carry out a particular scheme of landscape gardening.—*I. J. Condit.*

964. Knight, L. J. **Physiological aspects of self-sterility of the apple.** Proc. Amer. Soc. Hort. Sci. **14**: 101–105. 1918.—The work was done largely with Rome Beauty pollinated by Rome Beauty and Rome Beauty pollinated by Jonathan. The material was killed by Gilson's fluid and preserved for study in 70 per cent. alcohol.—The studies indicate that there is no stylar canal, and the pollen tubes make their way through the tissue. There is decomposition of the cells along this path or extrusion of mucilage. The progress of Jonathan tubes in Rome Beauty pistils seems to be facilitated, while that of Rome Beauty seems to be hindered. The embryo in Rome Beauty cross Jonathan at 192 hours was 2 to 3 celled, and by 240 hours was many celled. There was a marked effect of temperature on the rate of growth of Rome Beauty cross Rome Beauty tubes.—At a moderate temperature Rome Beauty tubes require 91 to 120 hours to traverse the Rome Beauty style. At a temperature of 80° to 90°F. only 24 hours were required. At moderate temperatures fertilization occurred within 24 hours in case of Rome Beauty cross Wagener and Wagener cross Rome Beauty.

The author thinks that occasional self-fertility may possibly be explained by the effect of high temperature on the rate of growth of the pollen tube. Asparagin (a trace) in 3 per cent. fructose solution increased rate of growth of the pollen tube. In a pollen tube 5 hours old one-twentieth mm. long 2 to 4 plugs are forming and the pollen tube is very soon shut off from the pollen grain and must, therefore, secure its nourishment from the stylar tissue.—The author draws the following conclusion:

(1) Self-sterility of Rome Beauty is not due to sterility of the pollen, as has been shown to be the case in certain varieties of grapes.

(2) Sensitiveness of pollen to overabundant moisture supply is not involved here as a factor, as has been shown by Jost for the pollen of many grasses, barley especially; and by J. N. Martin for the pollen of red clover. The pollen of Rome Beauty and many other varieties germinated well in distilled water.

(3) Rome Beauty stigmatic extract offers no inhibition to the germination and growth of Rome Beauty pollen.

(4) Rome Beauty stigmas offer no particular mechanical obstruction to the penetration of Rome Beauty tubes.

(5) Self-sterility of Rome Beauty is not due to inability of its own pollen tubes to grow deep enough to reach the egg. This has been suggested as the cause of self-sterility in certain pear and apple varieties by the work of Osterwalder.

(6) From present indications one important factor in self-sterility of Rome Beauty is the relatively slow rate of growth of Rome Beauty tubes in Rome Beauty stylar tissue Doubtless other factors will be found upon further investigation.

965. Latham, Consul C. L. **The orange oil industry in Jamaica.** *California Cultivator* **50**: 261. Mar. 2, 1918.—The orange oil industry in Jamaica dates from the Messina earthquake in 1908 which temporarily demoralized the Sicilian oil industry. The oil is extracted

on a "rinder" which is a shallow, tin-lined copper vessel studded thickly with copper tacks $\frac{1}{4}$ inch long, pointing upward and inward. The bottom consists of a funnel shaped oil receptacle which can be closed at lower and smaller end. The rinder is placed between the press; the orange is rolled on the points until no more oil exudes. When the receptacle is filled, the oil is poured through a cloth. Frequently the oil must be allowed to settle to remove mucilage and juice. It is filtered into copper containers lined with tin. Mechanical rinders have been unsuccessful. Work is done by women and children at low wages. Yield of oil is low. The rinders are carried to the scattered trees and the oil is extracted on the spot. This reduces transportation costs. Fruit must not be too ripe or dark colored oil will result. Twelve hundred oranges yield $2\frac{1}{2}$ pounds of oil. Eight hours work is necessary to give 1 pound of oil per worker. Oil of best quality is secured when extracted early in the morning. Extracted oranges are discarded or fed to stock.—*W. V. Cruess.*

966. Markarian, Henry. **How we can improve the quality of our dried figs.** California Cultivator 50: 100. Jan. 26, 1918.—Contains practical advice to fig growers.

967. Miller, C. C. **Bud curl of the lemon tree.** Monthly Bull. California State Comm. Hort. 7: 515–519. *Figs. 70–74.* Sept., 1918.—Bud curl is a term used by the writer for the enlargement of the trunks of lemon trees just above the bud-union where a piling-up of woody material goes on from year to year. The accumulation of this woody material results in extreme cases in a condition designated as "bud pinch" which constricts the bark and prevents the free passage of elaborated plant food to the roots. Some improvement can be gained by cutting through the bark from an inch below to an inch above the pinched area. If the pinching has continued for several years and the tree has suffered as a result, it is recommended that the tree be removed and a new one planted.—*I. J. Condit.*

968. Popenoe, W. **Agricultural explorations in Mexico.** California Citrograph 4: 2. Nov., 1918.—As an agricultural explorer for the University of California, Mr. Popenoe reports the results of investigations made in different parts of Mexico during 1918. His studies were made in Tampico, State of Tamaulipas and the State of Vera Cruz. Notes are given regarding the occurrence of Avocados, Chayotes, Mangos, Annonas, and a species of Attalea, the seed of which are utilized for oil.—*I. J. Condit.*

969. Taylor, R. H. **The almond in California.** California Agric. Exp. Sta. Bull. 297. *P. 1–72, fig. 28.* 1918.—Reports results of observation and study of almond industry in more important districts of California for past six years.—Concerning the habit of the almond plant, it is the first of deciduous fruit trees to start growth and bloom in spring and normally the last one to shed its leaves in fall; has a short rest period; young trees may bloom three or four days later than old trees; the wood is very hard and strong, but somewhat subject to heart rot, and all varieties are self-sterile and some are inter-sterile. Thus Nonpareil and I X L are inter-sterile; also Languedoc and Texas and I X L with Peerless. The nuts are of two general classes—sweet and bitter.

When properly pruned and conditions of soil and moisture are favorable the nuts grow and ripen more satisfactorily in the greater heat of the interior valleys than along the coast. The tree is considered hardy and able to endure fully as much cold as the hardiest peach, without injury. Blossoms with petals beginning to fall have in some cases withstood 28°F. In other cases temperatures of 30° and 31°F. have killed blossoms with the petals falling. The duration of these temperatures is not given. After the young fruit has attained the size of a pea it rapidly becomes less resistant to low temperatures.—Practical directions for growing, including disease and insect control and for harvesting are given with discussion of varieties and classification.—*E. L. Overholser.*

970. Wilson, C. P. **Summary of talk on lemon by-products.** California Citrograph 3: 140, April, 1918.—About 6 per cent. of crop of members of Exchange By-Products Co. shipped to factory at Corona last season. The calcium citrate made by this company contains about 70 per cent. citric acid compared to a possible 73.7 per cent. The Exchange Company's

citrate averages about 6 per cent. higher in citric acid content than does the usual commercial citrate. During 1916-17 season the Company used 5120 tons of lemons; produced 180,000 pounds of citric acid and returned $10 per ton to growers; this is $4 per ton better than previous season. Estimated increase in lemon crop for next six years is 114 per cent. If present rate of increase in consumption of fresh fruit is increased five times it will still leave 60,000 tons of fruit to be disposed of. Lemon oil and citric acid must form basis for their utilization. This amount of fruit will yield 500,000 pounds of lemon oil, and 500,000 pounds of citric acid, or provide half of present consumption of acid in United States and all our lemon oil there consumed. Value conservatively of $1,600,000. Authorized capital of the Company is now increased to $200,000 to permit development of other products. Manufacture of oil and candied, dried or brined peel contemplated. By-products are made at cost. All dividends are returned to members of the Exchange, who are growers.—*W. V. Cruess.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

[Unsigned abstracts are by the editor.]

[NOTE. The title of this section is wrongly printed in previous issue of Bot. Absts. (vol. I, p. 99), where "of vascular plants" should be deleted. With the coming rearrangement of sections the restricted title will apply, but is not yet in force.—*Ed.-in-Chief.*]

THALLOPHYTES

971. Atkinson, G. F. **Development in gymnocarpous Agaricaceae.** Bot. Gaz. 66: 459-460. 1918. [Review of: Douglas, Gertrude E. The development of some exogenous species of agarics. Amer. Jour. Bot. 5: 36-54. *Pl. 1-7.* 1918; and Blizzard, A. W. The development of some species of agarics. Amer. Jour. Bot. 4: 221-240. *Pl. 6-11.* 1917.]—Summary of chief results of these two papers. Reviewer notes that in gymnocarpous forms the origin and general course of development of hymenophore corresponds with that of angiocarpous forms of the Agaricus type. [See Bot. Absts. 1, Entry 65.]

PTERIDOPHYTES

972. Bower, F. O. **Studies in the phylogeny of the Filicales. VII. The Pteroideae.** Ann. Bot. 32: 1-68. 43 *fig.*. 1918. [Abst. by Coulter, J. M., Bot. Gaz. 66: 183. 1918.]—See Bot. Absts. 1, Entry 62.

973. Chamberlain, Charles J. **Prothallia and sporelings of lycopods.** Bot. Gaz. 65: 565-568. 1918. [Review of: Holloway, J. E. A comparative study of the anatomy of six New Zealand species of Lycopodium. Trans. New Zealand Inst. 42: 356-370. *Pl. 31-34.* 1909. Idem. Studies in the New Zealand species of the genus Lycopodium. Part I. *Ibid.* 48: 253-303. *Pl. 17, 18. 102 fig.* 1916. Idem. Studies in the New Zealand species of the genus Lycopodium. Part II. Methods of vegetative reproduction. *Ibid.* 49: 80-93. *Pl. 8, 9, 24. fig.* 1917. Lawson, A. Anstruther. The prothallus of *Tmesipteris tannensis.* Trans. Roy. Soc. Edinburgh 51: 785-794. *Pl. 1-3.* 1917. Idem. The gametophyte generation of the Psilotaceae. *Ibid.* 52: 93-113. *Pl. 1-5.* 1917.]—Reviewer summarizes Holloway's work on comparative anatomy and on prothallia of the New Zealand species of Lycopodium. The radial type of stele is believed to be primitive and the banded type derived from it. Considerable variation in stelar anatomy of adult plant is noted. Prothallia of 10 species are described, several of them for the first time, but no type strictly new to the genus is discovered. Methods of vegetative propagation are dealt with. Author believes that various sections of genus have not been separated from very ancient times but are rather closely interrelated.

Reviewer summarizes Lawson's work on prothallia of Tmesipteris and Psilotum. He takes issue with author's statement that gametophyte of Psilotum bears no structural

resemblance to that of Lycopodium, and believes that evidence from prothalia indicates relationship between Psilotales and Lycopodiales.

974. KASHYAP, S. R. **Notes on Equisetum debile Roxb.** Ann. Bot. 31: 439–445. 3 *fig.* 1917.—Endodermis and prothallium were studied and position of former is described. Character of prothallium varies according to thickness with which spores are sown. [From abst. by Coulter, J. M., Bot. Gaz. 65: 491. 1918.]

975. STEIL, W. N. **Studies of some new cases of apogamy in ferns.** Bull. Torr. Bot. Club. 45: 93–108. *Pl. 4, 5.* 1918. [Abst. by Coulter, J. M., in Bot. Gaz. 66: 80. 1918.]—See Bot. Absts. 1, Entry 276.

SEED PLANTS

976. BROWN, MABEL MARY. **The development of the embryo sac and of the embryo in Phaseolus vulgaris.** Bull. Torrey. Bot. Club 44: 535–544. *Pl. 25, 26.* 1917.—Morphology of this species presents nothing unusual. [From abst. by Coulter, J. M., Bot. Gaz. 65: 376. 1918.]

977. BUCHHOLZ, JOHN THEODORE. **Suspensor and early embryo of Pinus.** Bot. Gaz. 66: 185–228. *Pl. 6–10, 3 fig.* 1918.—Embryos with basal portions of old archegonia and suspensors were taken from living ovules by removing upper portion of gametophyte and teasing them out. These were stained and mounted *in toto*. At time of fertilization starch grains appear in cells of gametophyte just beneath archegonia. Prior to elongation of suspensors, these starch-containing cells break down and form the corrosive cavity into which developing embryo is pushed by growth of suspensor. Each of the 4 cells in the embryonal group of proembryo is an apical cell. These do not divide until after tier of suspensor cells has begun to elongate. By two successive divisions the apical cells cut off first and second embryonal tube initials; these elongate, forming secondary suspensors. The 4 vertical rows of cells thus formed always separate and develop 4 embryos, thus producing polyembryony by cleavage. A primary suspensor tube never divides to form 2 tubes, but embryonal tube initials may, before elongation, divide by periclinal walls into 2 or more cells all of which elongate together. As succeeding embryonal tubes are cut from apical cell, they divide by vertical walls. When cell walls are laid down in the proembryo, the cells at the organic apex begin to function as apical cells. The primary suspensor and from 2 to 4 embryonal tubes are cut off from one face of apical cell before the tetrahedral apical cell is organized. This apical cell with three cutting faces persists until a cylindrical body of several hundred cells is formed, nearly all of which later take part in the formation of the secondary suspensor. The rosette cells are embryo initials. These embryos grow by apical cells with three cutting faces, but growth ceases before they reach any considerable size. Thus an archegonium normally produces 8 embryos. In some cases the rosette cells elongate and resemble the suspensor except that their cells divide and those of the primary suspensor never do. No evidence was found that twin embryos may arise by splitting of one of the 4 primary embryos, and no seeds were found in which two of the primary embryos had developed equally and fully. The first body region to appear is the plerome of root tip; stem tip occurs in position formerly occupied by apical cell and is followed by ring of cotyledonary primordia. Number of primordia varies from 3 to 7; in some instances 2 were found to fuse to form one cotyledon, but at no stage is a cotyledonary tube formed.—A number of abnormalities are cited, the most striking being frequent occurrence of 2 gametophytes in same ovule of *P. Banksiana.* Author discusses development of embryo in Pinus in relation to that of other conifers and concludes that "Pinus is a very primitive and ancient genus."—*Margaret C. Ferguson.*

978. HARVEY, LEROY H. **Polyembryony in Quercus alba.** Michigan Acad. Sci. Rept. 1917: 329–331.—Records a case of polyembryony in *Quercus alba* and gives a summary of recorded cases of polyembryony in angiosperms. [From abst. by Coulter, J. M., Bot. Gaz. 66: 184. 1918.]

979. ISHIKAWA, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. **32**: 277–317. *pl. 1, 14 fig.* 1918.—*O. nutans*, *O. pycnocarpa* and their hybrids were studied. An axial row of 4 megaspores is formed. The micopylar or chalazal spore or both may develop into embryo sacs. Mother cell of embryo sac remains at micropylar end and divides twice. Mature embryo sac is tetranucleate with normal well defined egg apparatus but with no antipodals or chalazal polar. Polar nucleus increases in size, becoming identical in appearance with an ordinary endosperm nucleus which results from fusion of polar nuclei. Members of the egg apparatus are surrounded by cellulose walls, but this wall does not extend over lower part of oosphere. Rod- or biscuit-shaped structures suggesting chondriosomes were sometimes found in egg cell. When shed, pollen grain contains a vegetative nucleus and a generative nucleus and is packed with fusiform starch grains. Forty-eight hours after pollination tube has reached embryo sac. Each male nucleus is surrounded by definite mass of protoplasm. The vegetative nucleus was not detected after the tube had reached embryo sac. Pollen tube invades the synergid through the filiform apparatus, wall of synergid bursts and its contents flows over the lower part of the oosphere. The 2 sperm cells always pass through synergid to egg cell or pole nucleus. The sex nuclei come in contact as resting nuclei and fuse, giving rise to a large nucleus with 2 nucleoli. Triple fusion occurs and the endosperm nucleus contains diploid number of chromosomes. 16 endosperm nuclei are formed before fertilized egg divides. 3 male nuclei were sometimes observed in same embryo sac, 2 fusing with egg nucleus and 1 with polar. This triple fusion in egg nucleus might account for the triploid mutants reported in Oenothera. Sterility of certain hybrids results from slow growth of pollen tube.

Examination of large number of genera indicates that embryo sacs of all genera of Onagraceae are tetranucleate. They are monosporic, but in other families, tetranucleate sacs may be bisporic or tetrasporic in origin. It is pointed out that with rare exceptions plants with tetranucleate or 16-nucleate sacs are herbaceous, and may be regarded as derived types resulting from mutation and variation in the course of phylogenetic development. [See Bot. Absts. 1, Entries 482, 980.]—*Margaret C. Ferguson.*

980. ISHIKAWA, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. **32**: 277–317. *1 pl., 14 fig.* 1918. [Abst. by Coulter, J. M., Bot. Gaz. **66**: 184. 1918.]—See Bot. Absts. 1, Entries 482, 979.

981. SMALL, J. **The origin and development of the Compositae.—II. The pollen presentation mechanism.** New Phytol. 16: 198–221. *4 fig.* 1917.—Author distinguishes 14 types of style and 16 of stamens in Compositae, and discusses their phylogenetic significance. [From abst. in Exp. Sta. Rec. 39: 29. 1918.]

982. WENIGER, WANDA. **Fertilization in Lilium.** Bot. Gaz. **66**: 259–268. *Pl. 11–13.* 1918.—Lilium is again studied, this time from standpoint of cytological phenomena of fertilization. Chromatin of sperm and egg nucleus forms distinct spiremes before nuclear membrane of either nucleus disappears. Spiremes never fuse but segment independently into 12 chromosomes each. These associate in pairs and divide transversely. Of the 48 segments thus formed 24, one half maternal one half paternal, pass to each pole. In triple fusion 3 distinct spiremes are formed. There is no pairing of chromosomes in this division and each splits longitudinally as in ordinary vegetative division.—*Margaret C. Ferguson.*

983. WOLFE, JAMES J. **Alternation and parthenogenesis in Padina.** Jour. Elisha Mitchell Sci. Soc. **34**: 78–109. 1918.—The results of numerous experiments are described and also embodied in a series of eleven tables. The experiments cover behavior of tetraspores, fertilized eggs and unfertilized eggs. The former produce only male and female plants in approximately equal numbers; fertilized eggs produce tetrasporic plants only; unfertilized eggs undergo divisions but fail to mature.—*W. C. Coker.*

984. BEEKMAN, H. **Investigations with wood conducted at the forestry experiment station.** Boschbouwk. Tijdschr. Tectona **11**: 1–82. *Pl. 1, 10 fig.* 1918.—Includes work on identification of woods of the Dutch East Indies by anatomical structure. [From abst. in Exp. Sta. Rec. **39**: 246, 1918.]

985. Brush, W. D. **Distinguishing characters of North American sycamore woods.** Bot. Gaz. **64**: 480–496. *7 pl., 3 fig.* 1917.—Wood structure in native North American sycamores. [From abst. in Exp. Sta. Rec. **39**: 50. 1918.]

986. Chrysler, M. A. **Anatomy of woody plants.** Bot. Gaz. **65**: 363–364. 1918. [Review of: Jeffrey, E. C. The anatomy of woody plants. *p X + 478.* Univ. of Chicago Press, Chicago, 1917.]—Reviewer notes that this book is eminently comparative in its view of the subject; has phylogeny as its keynote; possesses a large number of excellent original illustrations; is clear in its style; contains no bibliography, and emphasizes the "canons of comparative anatomy" (*Recapitulation, Conservative Regions and Reversion*). He gives brief outline of contents and believes book will be useful to many types of botanists.

987. Flint, Esther M. **Structure of wood in blueberry and huckleberry.** Bot. Gaz. **65**: 556–559. *2 pl.* 1918. [Abst. in Exp. Sta. Rec. **39**: 243. 1918.] See Bot. Absts. 1, Entry 271.

988. Jaccard, P. **Bois de tension et bois de compression dans les branches dorsiventrales des feuilles.** [**Tension wood and compression wood in dorsiventral branches.**] Rev. Gén. Bot. **19**: 225–242. 1917.—"Wood of tension" on upper side of dorsiventral branches of dicotyledonous trees is produced by tension stimulus (weight of branch or bending due to other causes) acting upon cambium. It differs from "wood of compression" (found on lower side of branches) in more compact and regular grouping of fibers, reduction of vessels, greater development of medullary rays and greater length and smaller lumina of fibers. Data are presented as to microchemical character of torsion fibers, and their occurrence in indigenous trees of France. [From abst. by Crocker, W., Bot. Gaz. **65**: 487. 1918.]

989. Record, Samuel J. **Intercellular canals in dicotyledonous woods.** Jour. Forestry **16**: 429–441. *8 fig.* 1918.—Attention is called to occurrence of intercellular canals in secondary wood of representatives of 16 families of dicotyledons. These are frequently a normal feature of the wood, but sometimes develop as a result of injury. Vertical canals occur in tangential series or are scattered; radial canals are contained in the medullary rays and vary in number from 1 to 4 in a ray; occurrence in both planes is rare. In origin, canals are schizogenous, lysigenous or schizo-lysigenous. It is pointed out that presence of intercellular canals in a wood is a valuable diagnostic feature. [See Bot. Absts. 1, Entry 260.]—*L. C. Petry.*

990. Thompson, W. P. **Anatomy of Gnetum moluccense.** Bot. Gaz. **65**: 119. 1918. [Review of: La Rivière, Henriette C. Sur l'anatomie et l'epaississement des tiges du *Gnetum moluccense* Karst. Ann. Jard. Bot. Buitenzorg **30**: 32–58. *Pl. 4–12.* 1916.]—Author describes structure of a single branch of *Gnetum moluccense*, with special reference to accessory steles. Reviewer comments on the "remarkable conclusion" that these originate in nodes and then grow downward, the cambiums appearing at lower and lower levels in inner cortex. No phylogenetic conclusions are reached.

991. Kendall, J. N. **Abscission of flowers and fruits in the Solanaceae with special reference to Nicotiana.** Univ. of California Publ. Bot. **5**: 347–428. *5 pl., 10 fig.* 1918. [Abst. by Goodspeed, T. H., Bot. Gaz. **66**: 75–76. 1918.]—See Bot. Absts. 1, Entry 272.

992. Kendall, J. N. **Abscission of flowers and fruits in the Solanaceae, with special reference to Nicotiana.** Univ. of California Publ., Bot. **5**: 347–428. *5 pl., 10 fig.* 1918. [Abst. in Exp. Sta. Rec. **39**: 226. 1918.]—See Bot. Absts. 1, Entry 272.

993. Howard, A. and G. L. C. **The economic significance of the root development of agricultural crops.** Agric. Jour. India, Indian Sci. Cong. No., 17–28. *2* pl., *5 fig.* 1917.—Study of the relation between type of root system and such varietal characters as drought resistance. [From abst. in Exp. Sta. Rec. **39**: 230. 1918.]

994. Vorob'eb, S. I. **On the study of the root system of cereal and forage plants.** Selsk Khoz. i Liesov. **251**:477–505. 1916. (Abst. in Internat. Inst. Agric. (Rome), Internat. Rev. Sci. and Pract. Agric. **8**: 198–201. 1917.)—Study of the length, area of spread, depth of penetration and absorbing ability of the root systems of various plants. [From abst. in Exp. Sta. Rec. **39**: 230. 1918.]

995. Haasis, F. W. **Comparative length of growing season of ring-porous and diffuse-porous woods.** Plant World **20**: 354–356. 1917.—Ring-porous species finish their summer growth earlier than diffuse-porous ones. [From abst. in Exp. Sta. Rec. **39**: 122. 1918.]

996. Wylie, Robert B. **Cleistogamy in Heteranthera dubia.** Bull. Lab. Nat. Hist. Univ Iowa **7**: 48–58. 1917.—*Heteranthera dubia* is a submersed species. Most of the flowers remain under water and are cleistogamous. The few which reach the air are also apparently self fertilized. [From abst. by Coulter, J. M., Bot. Gaz. **65**: 197. 1918.]

997. Tenopyr, Lillian A. **On the constancy of cell shape in leaves of varying shape.** Bull. Torrey Bot. Club **45**: 51–76. *Fig. 1.* 1918. [Abst. in Exp. Sta. Rec. **39**: 226. 1918.] —See Bot. Absts. 1, Entry 72.

998. Bailey, I. W., and W. W. Tupper. **Size variation in tracheary cells: I. A comparison between the secondary xylems of vascular cryptogams, gymnosperms and angiosperms.** Proc. Amer. Acad. Arts and Sci. **54**: 149–204. *6 fig.* 1918.—A "reconnaissance survey" of the comparative length of the tracheary elements in secondary xylem of trees and shrubs among vascular plants. Measurements were made of length of various types of tracheary cells in 440 species belonging to 124 families. In vascular cryptogams and in older gymnosperms (Cordaitales, Bennettitales, Cycadales) these cells were found to be very long; in conifers, somewhat shorter; and in Gnetales and angiosperms, very much shorter. Exceptions are the vesselless Trocbodendraceae and Magnoliaceae, which resemble gymnosperms in possessing very long tracheary elements. Reduction in length of first formed cells of secondary xylem has been associated (phylogenetically) with reduction in amount of primary xylem. Evolution and differentiation of vessels has also resulted in general reduction in length of all tracheary cells. Cell length also varies with age of plant, with vigor and rapidity of growth, and with position of cells with regard to regions where growtb adjustments are taking place (wounds, junctions of stems, etc.). There is no absolute correlation between body size and cell size in material studied. Authors summarize literature on cell size and emphasizes need of further investigation along these lines. [See Bot. Absts. **1**, Entry 584.]

999. Waldron, R. A. **The peanut (Arachis hypogaea)—its history, histology, physiology and utility.** Thesis, Univ. of Pennsylvania, May, 1918. *301-338 p., 2 pl., 3 fig.* Philadelphia, Pa., 1918.—Includes work on morphology of peanut plant. Root hairs are present in "rosettes" at base of side roots. Normal "tip" hairs occur only on very young, rapidly growing plants. Hypocotyl tends to become tuberous. Crystal cells are common in epidermis of stem and leaves. Epidermis of carpellary tips is markedly granular, suggesting the presence of a perceptive region here which determines the geotropic reaction of the gynophore. Structure of gynophore and young fruit is described.

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

[Unsigned abstracts are by the editor.]

1000. Berry, Edward W. **A Cretaceous Hymenaea from Alabama.** Amer. Jour. Sci. **47**: 65–68. *00 fig.* Jan., 1919.—Describes and figures a remarkably well preserved new species, *Hymenaea fayettensis*, from the Upper Cretaceous Tuscaloosa formation of western central Alabama.

1001. Lemoine, Madame Paul. **Contribution a l'étude des Corallinacées.** Bull. Soc. Géol. France. iv, 17: 233–283, *23 fig.* (1917) 1918.—A comprehensive paper comprising four distinct contributions to the knowledge of the fossil Corallinaceae. Part 1—Généralités sur la structure des Corallinacées (pp. 233–240) discusses the morphology of the known forms. Part 2—Etat actuel de nos connaissances sur les Corallinacées fossiles (pp. 240–256) is an extremely valuable summary of the existing state of knowledge, listing all of the known fossil forms with their geologic and geographic occurrences. The list will surprise students of recent forms since it includes a large number of types, some present in ages as remote as the Cambrian, and serving to emphasize the importance of these algae in reef building. A complete bibliography is appended to this part. Part 3—Corallinacées fossiles de la Martinique (pp. 256–279, t. f. 1–23) is devoted to the description and figuring of new species all of which are probably of lower Miocene (Aquitanian) age, although some were contained in rocks ejected during the eruption of Mont Pelée and therefore of uncertain age. The species all of which are new, comprise 4 of Lithothamnium (*peleense, caravellense, Douvillei, Lacroixi*), 6 of Lithophyllum (*Giraudi, premoluccense, martinicense, preprototypum, prelichenoides Dublancqui*), one each of Corallina (*Cossmanni*), Arthrocardia (*Mangini*) and Amphiroa (*prefragilissima*). Some of these are very satisfactory, showing conceptacles with spores. Part 4—(pp. 280–283) records the occurrence of *Lithophyllum amphiroaeformis*, described originally by Rothpletz from the Upper Cretaceous (Turonian) of France (Var.), in the late Lower Cretaceous (Albian) of Landes, France.

1002. Lundqvist, T. **Variationstypen von Baiera minuta Nathorst.** Geol. Fören. Förhandl. 40[5]: *p. 491–502. 9 text fig., 9 pl. 1918.—Discusses the variations in leaf form of Ginkgo minuta* Nathorst, as shown by a series of well preserved specimens from the *Lepidopteris ottonis zone* of the Rhaetian or late Triassic coal deposits of Bjuf in Sweden. The author regards these forms as referable to the extinct genus Baiera instead of to Ginkgo and shows that they vary through almost as wide limits as do the leaves of the existing *Ginkgo biloba, some of the variants of the latter suggesting this ancient fossil species. Baiera minuta* in its larger forms has deeply divided non petiolate leaves resembling closely the typical and wide-ranging late Triassic species *Baiera muensteriana* (Presl.) Heer, while other and smaller leaves show fewer divisions and an incipient petiole suggesting these features of various Jurassic species of Ginkgo and some of the variants of the still existing species.

1003. Ramsay, W. **Växtförande aflagringar och det postglaciala hafvets gräns i Liljendals socken, Nylands län.** Geol. Fören. Förhandl. 40[6]: 529–534. 1918.—Describes the late Quaternary or post-glacial deposits of Liljendal which are situated about 75 km. northeast of Helsingfors in district of Nyland, Finland. Two horizons contain fossil plants. The older of these is correlated with the time during which the Baltic region was shut off from the ocean and known as the Ancylus Lake, the climate being dryer and warmer than at present. The younger horizon is correlated with that part of the post-glacial when the Baltic had re-established its connection with the Atlantic and is known as the Litorina sea, at which time the climate appears to have been much warmer than at the present time. The Ancylus flora as represented at Liljendal comprises 28 species including Pinus, Picea, Alnus, Betula, Rhamnus, Populus, Robus, Nupbar, Potamogeton, Phragmites, Scirpus, Carex, and numerous diatoms. The Litorina flora contains Pinus, Alnus, Betula, Tilia, Phragmites and diatoms.

PATHOLOGY

Donald Reddick, *Editor*

[Unsigned abstracts are by the editor.

1004. Allard, H. A. **Effects of various salts, acids, germicides, etc., upon the infectivity of the virus causing the mosaic disease of tobacco.** Jour. Agric. Res. 13: 619–637. 1918.—The writer treats the virus solution (juice from diseased plants) with a solution of the compound

under investigation. The concentration of the various compounds are, wherever possible, given as grams of water-free reagent in cubic centimeters of virus solution. The effect of the reagent on the virus was determined by inoculating healthy tobacco plants with the mixture and observing tbe effect. The concentrations of nitric and hydrochloric acid necessary to affect the infectivity of the virus solution was 1 gram in 50 to 100 cc.; for phosphoric, citric and acetic, 1 gram in 20 to 50 cc. The ability to infect tobacco plants was not destroyed when the virus was treated with 1 gram in 100 cc. of aluminum sulphate, silver nitrate or mercuric chloride; 1 gram in 200 cc. of lead nitrate; 1 gram in 50 cc. of lithium nitrate, sodium carbonate or sodium nitrate; and 1 gram in 12.5 cc. of manganese sulphate. These were highest concentrations of these salts used. It required about 1 gram of sodium hydroxid to 2000 cc. of virus solution, 1 gram to 500 cc. of copper sulphate, 1 gram to 100 cc. of zinc chloride, and 1 gram to 100 cc. of potassium permanagante to produce any noticeable effect. Carbolic acid "creolin," cresol and "Phenaco" affected the infectivity of the virus but little. Chloral hydrate, naphthalene crystals, camphor and thymol had no appreciable effect. Glycerine, sodium benzoate, quinine bisulphate, tannic acid, sodium taurocholate, and saponin affected the infectivity of the virus in rather high concentrations. The virus could be preserved in 45 per cent ethyl alcohol for 21 days or 40 per cent acetone for 77 days without destroying the infective principle. Higher concentrations of these two substances affected it. Four per cent. formaldehyde quickly destroyed its infectious properties as did mixing it with talc, kaolin or soil for a period.—*Lon A. Hawkins.*

1005. Allen, F. W. **Picking the apple for flavor and keeping quality.** Proc. Washington State Hort. Assoc. **14**: 106–110. 1918.—The apple troubles considered are ordinary and soft scald and Jonathan spot. Premature picking increased the amount of scald, and late picking increased the amount of Jonathan spot.—*F. D. Heald.*

1006. Brown, H. B., and C. T. Ames. **Cotton experiments, 1917.** Mississippi Agric. Exp. Sta. Bull. **184**: 1–27. Feb., 1918.—Includes a test of varieties of cotton more or less resistant to the wilt disease caused by *Fusarium vasinfectum*. Gives the percentage of wilt and the money value of the cotton produced. A variety showing high resistance to the wilt is not always the best yielding variety under boll weevil conditions.—*C. W. Edgerton.*

1007. Edgerton, C. W. **Delayed ripening of tomatoes caused by spraying with Bordeaux mixture.** Louisiana Agric. Exp. Sta. Bull. **164**: 1–16. *Fig. 1–4.* Sept., 1918.—While Bordeaux mixture will check the leaf diseases caused by *Alternaria solani* and *Cladosporium fulvum*, it also causes a delayed ripening of the fruit and does not always result in a greater yield. Results of three years tests show that the delay in ripening caused by spraying may be as much as one to two weeks. Spraying is advocated only to check serious epiphytotics.—*C. W. E.*

1008. Fisher, D. F. **The abuse of water on fruit and trees.** Proc. Washington State Hort. Assoc. **14**: 19–27. 1918. A discussion of chronic drouth as affecting growth of apple trees and the size of fruit; sudden and acute drouth as the cause of spot necrosis or drouth spot; drouth in late July and August as the cause of "punk;" the relation of soil type and shortage of water supply to cork. Results of irrigation experiments on bitter pit are given showing an increase with heavy or over-irrigation and a reduction with heavy irrigation followed by light applications. The claim is made without the presentation of experimental evidence, that "collar rot" in the Northwest is not the result of the abuse of irrigation water (winter injury), but is generally caused by the bacteria of fire blight.—*F. D. Heald.*

1009. Fromme, F. D., and W. J. Schoene. **Dusting and spraying for apple scab and codling moth.** Rept. Virginia State Entomologist and Plant Pathologist 1916–17: 22–26. 1918.—A dusting mixture of sulfur, hydrated lime, and arsenate of lead gave satisfactory control of apple scab under conditions of moderate infection but was not as efficient as liquid applications of lime-sulfur solution under conditions of heavy scab infection. Considerable burning of fruit and foliage resulted from the arsenate of lead in both dust and liquid mixtures.—*Fromme.*

1010. Gaines, E. F. **Comparative smut resistance of Washington wheats.** Proc. Washington State Grain Growers, Shippers and Millers Assoc. 12: 21–25. 1918.—Of ten varieties tested Turkey was the most resistant and the club hybrids the most susceptible. Hybrid 128, one of the most susceptible of the club wheats, gave however the highest acre value under field conditions.—*F. D. Heald.*

1011. Gardner, V. R. **Pollination of sweet cherries.** Proc. Washington State Hort. Assoc. 14: 72–77. 1918.—Mainly a discussion of improper pollination as a cause of sterility or the failure to set fruit.—*F. D. Heald.*

1012. Heald, F. D. **The most effective method of controlling smut.** Proc. Washington State Grain Growers, Shippers and Millers Assoc. 12: 26–34. *Fig. 1.* 1918—Reports of the occurrence of large numbers of spores of *Tilletia tritici* on grain threshed from apparently smut-free fields; the ineffectiveness of seed treatment for fall plantings due to soil infestation from wind-blown spores; a summary of the results on the "smut shower" for the seasons of 1915 and 1916. A discussion follows on the relation of time of planting to the percentage of smut. Carefully treated winter wheat shows varying amounts depending upon the seeding time, ranging from none to 5 per cent, in August plantings to a maximum of 30 to 40 per cent., in early October, followed by a decline through the later seedings. The early seedings were not only nearly smut-free but survived the winter much better than the late seedings. A summary of the cooperative work on the use of smut exhaust fans on threshing machines is reported.—*F. D. Heald.*

1013. Heald, F. D. **Diseases of the potato.** Proc. Washington State Hort. Assoc. 14: 115–124. 1918.—Popular presentation of losses from potato diseases, their cause and their prevention or control by rogueing, seed selection, proper handling and storage, spraying, seed disinfection and soil management.—*F. D. Heald.*

1014. Jones, L. R. **Disease resistance in cabbage.** Proc. Nation. Acad. Sci. 4: 42–46. 1918.—See Bot. Absts. 1, Entries 321, 903.

1015. Mackie, W. W. **A possible new fungicide for wheat and barley smut.** Science 48: 515–516. 1918.—Preliminary seed-treatment tests with lime-sulfur solution for the control of stinking smut of wheat and covered smut of barley have given promising results. In comparison with the bluestone-lime dip now commonly used ou the Pacific coast, the lime-sulfur dip is said to be cheaper and easier of application in that it involves single instead of double dipping. It produces no noticeable deleterious effects on germination and fully protects seed sown in smut-infested soil.—*V. F. Tapke.*

1016. MacMillan, H. G. **An epidemic of corn smut following hail.** Phytopath. 8: 584–585. 1918.—Two weeks after severe hail storm 19 per cent. of stalks of maize showed uniformly small smut boils (Ustilago zeae). Outside the hail area 1 per cent. infection was found. Lesions occurred only at leaf axils, never at bruises. It is thought that hail may have broken open the boils and have allowed for the distribution of an unusually large number of spores.

1017. McClintock, J. A., and L. B. Smith. **True nature of spinach blight and relation of insects to its transmission.** Jour. Agric. Res. 14: 1–60. 1918.—Results of a study of spinach blight in eastern Virginia. Estimated loss from disease is $200,000 to $400,000 yearly. Disease is characterized by a yellow mottling of the leaves which are small, malformed and become brown and die in the later stages. The disease can be transmitted by inoculating healthy plants with juice from diseased individuals. Infection is spread by aphids. Two species, *Macrosiphum solanifolii* and *Rhopalosiphum persicae* are commonly found on spinach in that region and both act as carriers. *M. solanifolii* is apparently more important in spreading

the disease.—Non-virus bearing aphids must feed on diseased plants from two minutes to fourteen hours before they become a carrier. Virus bearing aphids produced infection in healthy plants when allowed to feed on them for two minutes. Infection may be carried to several healthy plants by one aphid. Virus bearing aphids do not lose ability to transmit the disease during moulting, and infections were obtained from the offsprings of virus bearing aphids which had not previously partaken of food.—Control of aphids infesting spinach offers most immediate possibility for control of the disease.—*Lon A. Hawkins.*

1018. Melchers, Leo E. **Potato seed diseases and their treatment.** Kansas Agric. Exp. Sta. Circ. 63. 1918.

1019. Melchers, Leo E. **The mosaic or white pickle disease of cucumbers.** Trans. Kansas State Hort. Soc. 34: 102–104. 1918.—A description of white pickle and its symptoms as occurring in greenhouses in Wichita, Kansas. The disease ruined about 20 per cent. of the crop. Sanitary measures advocated.—*L. E. Melchers.*

1020. Melchers, Leo E., and John H. Parker. **Another strain of Puccinia graminis.** Kansas Agric. Exp. Sta. Circ. 68. May, 1918.—A biologic form of stem rust of wheat which has been given the name *Puccinia graminis tritici-inficiens* has been reported as occurring in Kansas and Minnesota. It is physiologically distinct from *Puccinia graminis tritici*, in that it attacks three differential wheats: Kanred, P1066 and P1068, which recently were published by the authors as showing marked resistance to *Puccinia graminis tritici.* It is likewise physiologically distinct from *Puccinia graminis tritici-compacti*, in that it vigorously attacks Haynes Blue Stem (Minn. 169), which is known to be non-congenial to *Puccinia graminis tritici-compacti.*—*L. E. Melchers.*

1021. Neal, David C. **Sweet potato stem-rot or wilt.** Louisiana State Univ. Extens. Circ. 28: 1–4. Oct. 1918.—Describes the stem-rot of sweet potato caused by Fusarium and gives methods of control, including seed selection, seed-bed sanitation and crop rotation. Home selection of seed is preferable to buying seed from other localities.—*C. W. Edgerton.*

1022. Osner, George A. **Additions to the list of plant diseases of economic importance in Indiana, II.** Proc. Indiana Acad. Sci. 1917: 145–147. 1918.—The author lists 24 diseases on 17 hosts which have not previously been recorded for the state. (Supplementary to article by same author. Proc. Ind. Acad. Sci. 1916: 327–332. 1918.)—*H. S. Jackson.*

1023. Peltier, Geo. L. **Susceptibility and resistance to citrus-canker of the wild relatives, citrus fruits and hybrids of the genus Citrus.** Jour. Agric. Res. 14: 337–358. Aug., 1918.—See Bot. Absts. 1, Entry 924.

1024. Reed, George M. **Physiological specialization of parasitic fungi.** Mem. Brooklyn Bot. Gard. 1: 348–409. 1918.—Critical review of the literature, mostly Uredine and Erysiphaceous, including that of bridging hosts. Bibliography of 174 titles.

1025. Robbins, W. W., and G. E. Eggington. **Alfalfa dodder in Colorado.** Colorado Agric. Exp. Sta. Bull. 248: 1–15. 1918.—Popular bulletin giving information on the prevalence of dodder in Colorado, general appearance of the parasite in the field, its life history, how it is spread, kinds of dodder infesting alfalfa in Colorado, methods of eradication, and methods of cleaning alfalfa seed to free it from dodder seed.—*W. W. Robins.*

1026. Rosen, H. H. **Notes on some methods and terms employed in studying the Uredinales.** Phytopath. 8: 581–583. 1918.

1027. Rosenbaum, J. **The origin and spread of tomato fruit rots in transit.** Phytopath. 8: 572–580. *fig. 1, pl. 4.* 1918.—A study of various tomato fruit rots occurring on winter-grown southern tomatoes, their origin and ability to spread in transit.—With the possible exception of Phoma rot and leak (*Rhizopus* sp.) the tomato fruit rots originate in the field

and spread in transit from infected fruit included in the pack. Based on their ability to spread in transit from infected fruit, the tomato fruit rots are divided as follows: (1) those rots in which the causal fungus can spread and infect an adjacent uninjured fruit (*Phytophthora terrestria*); (2) those in which the causal organism can spread but infects fruit only through the stem end or through some break in the skin of the tomato (*Rhizoctonia* sp., *Sclerotium rolfsii*, *Rhizopus* sp.); (3) those in which the causal fungus is unable to grow through the tomato wrappers and infect healthy adjacent fruit (*Macrosporium solani*, *Phoma destructiva*, *Colletotrichum phomoides*).—*J. Rosenbaum.*

1028. SACKETT, WALTER G. **Bacterial disease of the Wragg cherry.** *In* Report of the Bacteriologist. Colorado Agric. Exp. Sta. Ann. Rept. **30:** 20–21. 1918.—Lime-sulfur solution, self-boiled lime-sulfur and bordeaux mixture seemed to reduce the amount of disease but there was a mild case of spot and the bactericides used seemed to dwarf the fruit.

1029. SMITH, LOREN B. **Spinach blight and its transmission by insects.** Rept. Virginia State Entomologist and Plant Pathologist **1916–17:** 40–58. *Fig. 1–6.* 1918.—Review of a previous paper by McClintock and the author (Jour. Agr. Res. **14:** 1–59. 1918) showing the disease in question to be infectious, of unknown causation, and transmissible by aphids.—*F. D. Fromme.*

1030. TOBLER, F. **Ein neues tropisches Phyllosiphon, seine Lebensweise und Entwicklung.** Jahrb. wiss. Bot. **58:** 1–28. *Pl. 1, fig. 1–11.* 1917.—See Bot. Absts. 1, Entry 1050.

1031. VANDER BIJL, P. A. **Fomes applanatus (Pers) Wallr. in South Africa, and its effect on the wood of the black ironwood trees (Olea laurifolia).** South African Jour. Sci. **14:** 485. 1918.—The fungus is the main cause of the death and blowing over of large numbers of *Olea laurifolia* (black ironwood) trees in the Eastern Cape Conservancy; it is regarded as a wound parasite, and its effect on the wood is described.—*E. M. Doidge.*

1032. VASEY, H. E. **Millet smuts and their control.** Colorado Agric. Exp. Sta. Bull. **242:** 1–22. 1918.—Smut is the chief disease affecting millets in the Great Plains states. Plants were infected by inoculating the seeds. Spores of both *Ustilago crameri* and *U. panici-miliacei* subjected to formaldehyde gas for a 4, 6 and 12 hours failed to germinate. Millet smut spores retain their viability at least three years. Spore dissemination in the field is effected to some extent by a beetle (*Phalacrus politus*). A solution of 1 pint of formaldehyde in 40 to 45 gallons of water is found effective in treatment.—*W. W. Robbins.*

1033. WORTLEY, E. J. **Potato leaf-roll: its diagnosis and cause.** Phytopath. **8:** 507–529. *Fig. 1–16.* 1918.—Leaf-roll has caused from a half to a total loss of the potato crop on some farms in Bermuda. The lower leaves only are important in diagnosing the disease. The symptoms appear five to eight weeks after planting. The progeny of potatoes grown under unfavorable conditions showed largely increased percentages of leaf-roll, i.e. in drought conditions as compared with shade, in Bermuda as compared with Maine. No notable increase in leaf-roll was noted in the first crop in Bermuda from healthy seed in contrast to such cases reported by Quanjer and attributed to soil infection.—*F. M. Blodgett.*

1034. ZINSSMEISTER, C. L. **Ramularia root-rots of ginseng.** Phytopath. **8:** 557–571. *Fig. 1–8.* 1918.—The symptoms, history, distribution, and economic importance of a root disease of ginseng, *Panax quinquefolium*, to which the popular name rust has been given, are discussed.—Isolations made from material received from two widely separated states, New York and Wisconsin, yielded in the majority of cases, species of Ramularia. Cultural and morphological studies of the Ramularias obtained show that there are two distinct species, which are designated *Ramularia destructans* and *Ramularia panacicola*. Proof of the pathogenicity of these two species is furnished as well as evidence that the disease spreads during the dormant season. Descriptions of the two species are appended. [See Bot. Absts. 1, Entry 791.]—*J. Rosenbaum.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

1035. VALDIGUIÉ, M. **Saffron of Kosani.** Extrait du Bulletin Commerce Macédoine. [Through J. Pharm. et Chim. VII, 18: 183. 1918.] The saffron grows wild in Asia minor, in Persia and also in Greece, where it is especially cultivated in the region of Kosani, south and south west of Macedonia on a large plain, 700 meters high, where the temperature never is lower than 5°C. General descriptive data of the plants and the flowers are given and the statement is made that the material resembles French saffron closely and that it is largely exported to France and sold there as French (Gâtinais) saffron.—*Arno Viehoever.*

1036. VAN ITALLIE, L., AND H. J. LEMKES. **Analysis of Styrax.** Pharm. Weekblad 55: 141–149. [Through J. Pharm. et Chim. VII, 18: 181. 1918.]—The origin, main characteristics of Styrax and important analytical data are discussed, including especially the procedure for the quantitative determination of cinnamic acid. The amount of this acid present in 9 samples varied from 0 to 35.2 per cent. The saponification number does not indicate the amount of cinnamic acid present. Heated on the steambath, styrax should not develop any odor of oil of turpentine,—*Arno Viehoever.*

1037. VAN ITALLIE, L. **Chemical composition of Empetrum nigrum.** Pharm. Weekbl. 55: 709–718. [Through J. Pharm. et Chim. VII, 18: 180. 1918.] The leaves contain a wax (largely a ceryl compound), benzoic acid, tannin, fructose, urson and probably rutin. Urson in its anhydric form has the formula $C_{30}H_{16}O$ and is identical with the urson found in the leaves of the "Red Bear Berry" (Uva ursi) and other Ericaeae. Empetrum nigrum contains no alkaloids nor andromedotoxin or glucosides decomposed by emulsin. The presence of benzoic acid and urson, both found in several ericaceae, makes it probable that the empetraceae belong to the ericaceae, a suggestion already previously expressed by M. Hallier on the basis of their external and internal structure.—*Arno Viehoever.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

MOSSES

1038. DIXON, H. N. **Swartzia montana Lindb. in Surrey.** Jour. Bot. 56: 155–156. 1 918 —A note of an isolated new station for this moss.—*A. Le Roy Andrews.*

1039. DIXON, H. N. **Hypnum falcatum (Brid.) var. nov. delicatulum Dixon.** Jour. Bot. 56: 360. 1918.—A variant form from Dartmoor, England, collected by Mr. G. T. Harris is described under the above varietal name.—*A. Le Roy Andrews.*

1040. HESSELBO, AUG. **The Bryophyta of Iceland.** In: ROSENVINGE & WARMING. The botany of Iceland 1: 395–677. 1918.—On the basis of material gathered by himself and what was available of earlier collections the author lists 93 species of hepatics, 20 of *Sphagnum* and 324 (with 2 subspecies 326) of true mosses, including two new species of *Bryum* and one of *Brachythecium.* Under each species are included notes on distribution and habitat, and at the close the general ecological aspects are discussed, particularly as to the bryophytic vegetation about the various hot springs. The work is illustrated by a number of photographs.—*A. Le Roy Andrews.*

1041. HURST, C. P. **Philonotis caespitosa var. adpressa Dismier in Britain.** Jour. Bot. 56: 250. 1918.—A note of the occurrence of this variety near Burridge Heath, Great Bedwyn, South Wiltshire.—*A. LeRoy Andrews.*

1042. Luisier, A. **Fragments de bryologie ibérique.** Broteria 16: 123–142. 1918.—After a brief outline of previous publications, the author gives a list of all species of mosses thus far reported from the ancient province of Galicia, Spain, followed by a more detailed list of those species which are additions to the published flora. Critical notes accompany many of the species in the latter list, and a new variety each of *Fissidens* and of *Pohlia* is described.—*E. B. Chamberlain.*

1043. Machado, Antonio. **Apontamentos briológicos.** Broteria 16: 97–103. 1918.—The author gives critical notes, and cites localities for twenty species of mosses and four of hepatics which are either new or rare in the Portuguese flora. A new variety of *Fissidens* and one of *Rhynchostegium* are described.—*E. B. Chamberlain.*

1044. Potier de la Varde, R. **Sur trois mousses inédites de la Chine orientale.** Rev. Gén. Bot. 30: 346–354. 1918.—From the herbarium of the late Gen. Paris a collection of mosses made by R. P. Courtois in China in 1910 is listed. It comprises 22 species, 3 being described and figured as new, one each in *Macromitrium, Pylaisia,* and *Gollania.*—*A. Le Roy Andrews.*

1045. Wheldon, J. A. **Drepanocladus aduncus (Hedw.) var. Wheldoni Ren. in N. Somerset.** Jour. Bot. 56: 273. 1918.—This variety was found by Mr. C. P. Hurst on the Burnham sandhills, opposite Berrow Church.—*A. Le Roy Andrews.*

LIVERWORTS

1046. Campbell, D. H. **Studies on some East Indian Hepaticae.** Ann. Bot. 32: 319–338. *Pl. 8–9, fig. 1–10.* 1918.

1047. Douin, Ch. and R. **Le Reboulia Raddi.** Rev. Gén. Bot. 30: 129–145. *Fig. 1–15.* 1918.—According to most recent students of the Hepaticae the genus *Reboulia* is composed of a single variable and widely distributed species, *R. hemisphaerica* (L.) Raddi. The authors, on the basis of careful cultures, express the opinion that this species is an aggregate and separate from it, as new species, *R. occidentalis* of western Europe and *R. Charrieri* of the Mediterranean region. The specific characters relied upon are derived especially from the size and surface-markings of the spores, the form of the female receptacle, and the position of the male receptacle, which in all three species is in the form of a sessile disc. This disc is originally median and retains this position in *R. hemisphaerica*; in the other two species it becomes split into two by the subsequent growth of the male branch, the halves becoming displaced laterally and appearing marginal. In comparing the female receptacles of *Reboulia* with those of other genera of the Marchantiaceae the authors split off the new genus *Marchantiopsis* for the reception of *Marchantia geminata, M. Treubii,* etc. In the new genus the groups of archegonia are situated underneath the lobes, and the receptacles do not develop the conspicuous sterile rays between the groups, which constitute so striking a feature in *M. polymorpha* and the other typical species of *Marchantia.*—*A. W. Evans.*

1048. Hesselbo, Aug. **The Bryophyta of Iceland.** In: Rosenvinge & Warming. The botany of Iceland 1: 395–677. 1918.—See Bot. Absts. 1, Entry 1040.

1049. Machado, António. **Apontamentos briologicos.** Broteria 16: 97–103. 1918.—See Bot. Absts. 1, Entry 1043.

ALGAE

1050. Tobler, F. **Ein neues tropisches Phyllosiphon, seine Lebensweise und Entwicklung.** Jahrb. f. wiss. Bot. 58: 1–28. *Pl. 1, fig. 1–11.* 1917.—*Phyllosiphon asteriforme* is described as a new parasitic and endophytic siphonaceous alga on the leaves of *Zamioculcae zamiifoliae* Lodd. in German East Africa. The alga, while chlorophyll bearing, is strictly parasitic and causes in most cases a marked gall formation. Affinities of the new organism with other Phyllosiphonaceae are discussed.

1051. Wolfe, James J. **Alternation and parthenogenesis in Padina.** Jour. Elisha Mitchell Sci. Soc. 34: 78–109. 1918.—See Bot. Absts. 1, Entry 983.

FUNGI

1052. Blagaic-Zagreb, K. **Boletus conglobatus, eine neue Species.** Hedwigia 60: 10–11. 1918.—The species is described from Croatia.

1053. Henderson, M. P. **The black-leg disease of cabbage caused by Phoma lingam (Tode) Desmaz.** Phytopath. 8: 379–431. *Fig. 1–10.* 1918.—The data presented indicate that *Phoma siliquastrum* Desmaz., *Aposphaeria brassicae* Thüm., *Phoma oleracea* Sacc., *Phoma brassicae* Thüm, and probably also *Phoma napobrassicae* Rostr. are merely other names applied to this same fungus as it occurred under varying conditions. The fungus occurring on *Melilotus alba* and designated as *Phoma oleracea* Sacc. does not produce infection when inoculated into cabbage, and should be otherwise designated. Inoculations show that at least twenty-two members of the Cruciferae are hosts of *Phoma lingam.* [See Bot. Absts. 1, Entry 316.]—*H. M. Fitzpatrick.*

1054. Kulkarni, G. S. **Smuts of jowar (sorghum) in the Bombay Presidency.** Bull. Agric. Res. Inst. Pusa 78: 1–26. *Pl. 1–6.* 1918.—Four species are listed as occurring on sorghum, one of them reported for the first time from India.

1055. Lloyd, C. G. **Mycological notes, no. 53.** *P. 750–764.* Feb., 1918. [Cincinnati, Ohio.]—*Polyporus rusticus* received from S. Africa described as new. *Stropharia tuberosa* n. sp., described here by H. C. Beardslee, arises from a black sclerotium. Photographs and notes on "rare or interesting fungi received from correspondents" include the following: *Hydnum fimbriatum, Clathrus camerunensis, Polyporus rheades, Sebacina amesii, Catastoma ater, Isaria byssoidea, Tremella marmorata, Polystictus cryptomeniae, Polyporus vanderystii, Trametes ungulata, Scleroderma columnare, Polystictus stereoides, Cantharellus clavatus, Lenzites subferruginea, Polyporus grantii, Stereum liratum, Cyttaria gunnii, Lysurus sinensis, Polystictus cuneatus.*—*H. M. Fitzpatrick.*

1056. Pascher, Adolf. **Asterocystis de Wildeman und Asterocystis Gobi.** Beih. Bot. Centralbl. 35[2]: 578–579. 1917.—The name *Asterocystis* was given by Gobi in 1879 to an alga with affinities apparently with the Glaucophyceae. The same name was used by de Wildeman in 1893 for a member of the Olpidiaceae. The author suggests that the name in the sense of de Wildeman be dropped and proposes the generic name *Olpidiaster* instead. *Olpidiaster radicis* Pascher (*Asterocystis radicis* de Wildeman) therefore appears as a new name.

1057. Zeller, S. M. **Fungi found on Codium mucronatum.** Pub. Puget Sound Biol. Sta. 2: 121–125. *Pl. 20.* 1918.—Three new species of marine fungi are described from Friday Harbor, State of Washington. Of these *Chytridium codicola* and *Rhizophidium codicola* are Phycomycetes belonging to the family Chytridiaceae, and *Stemphylium Codii* is a Hyphomycete belonging to the family Dematiaceae.—*T. C. Frye.*

LICHENS

1058. Burnham, S. H. **Lichens of the Berkshire Hills, Massachusetts.** Bryologist 21: 29–32. 1918.—The author lists 55 species and varieties from Mt. Greylock, and 22 from other parts of the Berkshires.—*L. W. Riddle.*

1059. Durfee, T. **Lichens of the Mt. Monadnock region, N. H. X.**—Bryologist 21: 18. 1918.

1060. Fink, B. **A new genus and species of the Collemaceae.** Mycologia 10: 235–238. *Pl. 13.* 1918.—The author describes *Collemodes*, new genus, with *C. Bachmanianum*, new species, as the type, to be distinguished from *Collema pulposum* (Bern.) Ach. by differences in the sexual reproductive organs.—*L. W. Riddle.*

1061. Riddle, L. W. **Report on the lichens of St. Thomas and St. John.** In: N. L. Britton, The flora of the American Virgin Islands. Mem. Brooklyn Bot. Gard. 1: 109—115. *3 fig.* 1918.—Seventy species are listed, with one new species each in the genera *Opegrapha, Lecania,* and *Blastenia*; a new variety of *Leptogium marginellum* (Sw.) Mont.; and new combinations of *Caloplaca, Buellia,* and *Graphina.* [See Bot. Absts. 1, Entry 1077.]—*L. W. Riddle.*

1062. Riddle, L. W. **[Chapter on the Lichens.]** In: N. L. Britton, The flora of Bermuda. *Pp. 470-479.* Scribner, New York, 1918.

1063. Riddle, L. W. **Some extensions of ranges.** Bryologist 21: 50. 1918.—New stations are recorded for four interesting species of lichens, one, *Dirina repanda* (Fr.) Nyl., being new to North America.—*L. W. Riddle.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

Unsigned abstracts are by the editor.]

1064. Ashe, W. W. **Notes on Betula.** Rhodora 20: 63–64. 1918. *Betula lenta* var. *uber,* a new variety, is described from Virginia.

1065. Ashe, W. W. **Notes on southern woody plants.** Torreya 18: 71–74. 1918.—*Vaccinium Margarettae* Ashe is described as a new species from Georgia and South Carolina. New combinations are made in *Quercus* and in *Carya.*

1066. Baker, Edmund G. **The Sumatran species of Saurauja.** Jour. Bot. 56: 161–167. 1918.—The author recognizes twenty-five species of this genus from Sumatra, and of this number six species and two varieties are new to science.

1067. Bates, J. M. **A new Kochia.** Amer. Bot. 24: 51, 52. 1918.—The author characterizes a new species of *Kochia* (*K. alata*) from Nebraska.

1068. Bicknell, E. P. **The ferns and flowering plants of Nantucket. XIX.** Bull. Torr. Bot. Club 45: 365–383. 1918.—This article contains supplementary notes on several species previously mentioned in the series; *Quercus prinoides* var. *rufescens* Rehder is raised to specific rank.

1069. Blake, S. F. **On the names of some species of Viburnum.** Rhodora *20: 11–15.* 1918.—Blake finds that the plant known for many years as *Viburnum pubescens* auth,. not Pursh, should take the name *Viburnum affine* Bush of which he recognizes two varieties namely, var. *affine* (typical form) and var. *hypomalacum* (a new variety). Two new combinations are recorded under *Viburnum pubescens* (Ait.) Pursh namely, *V. pubescens* (Ait.) Pursh var. *Canbyi* (Rehder) Blake, and *V. pubescens* (Ait.) Pursh var. *longifolium* (Dippel) Blake.

1070. Blake, S. F. **Lycopodium sabinaefolium var. sharonense.** Rhodora *20: 60. 1918.* —Record is made of a new combination namely, *Lycopodium sabinaefolium* Willd. var. *sharonense* Blake.

1071. Blake, Sidney. **Notes on the Clayton herbarium.** Rhodora *20: 21–28,* 48–54, 65–73. *Figs. 1–8.* 1918.—From studies made of specimens in the Clayton herbarium, now at the British Museum, the author has found it necessary to make several nomenclatorial changes of American flowering plants. These changes concern the following genera: *Eleocharis, Fimbristylis, Rynchospora, Dioscorea, Helianthemum, Oenothera, Thaspium, Gratiola, Agalinis,* and *Gnaphalium.*

1072. Blake, S. F. **A variety of Smilax glauca.** Rhodora 20: 78–80. 1918.—The author describes two varieties of *Smilax glauca* Walt. namely, var. *genuina* and var. *leurophylla*.

1073. Blake, S. F. **Note on the proper name for the Sassafras.** Rhodora 20: 98–99. 1918.—Blake finds that the correct name for this well known plant is *Sassafras officinale* Nees & Eberm. The nearly glabrous and more or less glaucous form of this species is designated as var. *albidum* (Nutt.) Blake.

1074. Blake, S. F. **Notes on the flora of New Brunswick.** Rhodora 20: 101–107. 1918.—The author records a list of the plants collected in 1913 on the coastal sands of New Brunswick and adjacent small islands. A new hybrid is described as *Juncus alpinus* var. *insignis* × *brevicaudatus* Blake.

1075. Britton, N. L. **An undescribed Scirpus from California.** Torreya 18: 36. *Fig. 1.* 1918.—*Scirpus Congdoni* Britton is described and illustrated as a new species.

1076. Britton, N. L. **The relatives of Catalpa trees in the West Indies.** Jour. New York Bot. Gard. 19: 6–9. *Pl. 209.* 1918.—Author discusses a small group of trees or shrubs of the West Indies, which have been known hitherto either under the name of *Catalpa* or *Bignonia*. For these relatives of the typical *Catalpa* he has raised the sectional name *Macrocatalpa* of Grisebach to generic rank and includes three species namely, *M. longissima*, *M. punctata*, and *M. purpurea*.

1077. Britton, N. L. **The flora of the American Virgin Islands.** Brooklyn Bot. Gard. Mem. 1: 19–118. 1918. [Contrib. N. Y. Bot. Gard. No. 203.]—The present flora concerns primarily the islands of St. Thomas, St. Jan, and St. Croix. The number of species recorded for these islands, exclusive of the fungi and algae, is 1052, which are distributed among the following groups: spermatophytes 890, pteridophytes 41, bryophytes 46, and lichenes 75. The following new species and varieties are described: *Opuntia antillana* Britton & Rose, *Opegrapha acicularis* Riddle, *Lecania euthallina* Riddle, *Blastenia nigrocincta*, and *Leptogium marginellum* var. *isidiosellum* Riddle. Several new combinations are also included. [See Bot. Absts. 1, Entry 1061.]

1078. Burkill, I. H. **A new Dendrobium, D. gracilipes, from the Rhio Archipelago.** Jour. Straits Branch R. A. Soc. No. 79: 45–46. 1918.—*Dendrobium* (*Sarcopodium*) *gracilipes* is described and figured.

1079. Burkill, I. H. **Begonia Haniffii, a small tuberous species of the Islands of Lankawi.** Jour. Straits Branch R. A. Soc. No. 79: 103–104. 1918. *Begonia Haniffii*, a new species, is described and figured.

1080. Cañizares, Felipe Garcia. **El Jardin Botanico del Instituto de segunda Enseñanza de la Habana.** *Roy. 8vo, 169 p., pl. I–VI* (garden plans). Havana, 1918.—The author gives a historical account of the Botanical Garden in Havana, followed by a catalogue of the indigenous and exotic plants growing in the Garden. Both scientific and common names of plants are listed, and several species are illustrated by photographic reproductions.

1081. Cockerell, T. D. A. **A new hybrid sunflower.** Torreya 18: 11–14. 1918.—*Helianthus annus* × *petiolaris* is described as a new hybrid, grown under control conditions. [See Bot. Absts. 1, Entry 15.]

1082. Fernald, M. L. **American variations of Epilobium, section Chamaenerion.** Rhodora 20: 1–10. 1918.—The numerous variations of *Epilobium angustifolium* L. are reduced by the author to forma *albiflorum*, forma *spectabile*, var. *macrophyllum*, var. *intermedium*, and var. *platyphyllum*. A discussion on the supposed hybridization between *Epilobium angustifolium* and *E. latifolium* is also presented.

1083. Fernald, M. L. **Some American Epilobiums of the section Lysimachion.** Rhodora 20: 29–30. 1918.—*Epilobium densum* Raf., var. *nesophilum* Fernald is described as a new variety from Newfoundland and the Magdalen Islands, and *E. molle* Torr., var. *sabulonense* Fernald, also a new variety, from Sable Island off Nova Scotia. *Epilobium glandulosum* Lehm. and *E. adenocaulon* Haussk. are discussed in detail and treated as conspecific; and six varieties are characterized under *E. glandulosum*. A new species, *Epilobium Steckerianum*, is recorded from Labrador.

1084. Fernald, M. L. **The North American Littorella.** Rhodora 20: 61–62. 1918.—The American plant hitherto known as *Littorrella uniflora* is shown to be specifically distinct from *L. uniflora* (L.) Asch. of Europe, and to it is given the name *Littorella americana* Fernald.

1085. Fernald, M. L. **The validity of Oxalis americana.** Rhodora 20: 76–78. 1918.—Fernald points out that the American plant commonly known as *Oxalis Acetosella* should take the name *O. americana* Bigelow, and describes the pink-flowered form of this species as *rhodantha*.

1086. Fernald, M. L. **Rosa blanda and its allies of northern Maine and adjacent Canada.** Rhodora 20: 90–96. 1918.—The writer discusses *Rosa blanda* Ait. and its near relatives and includes descriptions of two new species namely *Rosa johannensis* with its white flowered form *albina* from the St. John Valley, and *Rosa Williamsii* from Quebec.

1087. Fernald, M. L., and K. M. Wiegand. **Some new species and varieties of Poa from North America.** Rhodora 20: 122–127. 1918.—The authors have published the following new species and variety of *Poa: P. saltuensis*, its variety *microlepis*, and *P. paludigena*.

1088. Fernald, M. L. **The American representations of Equisetum sylvaticum.** Rhodora 20: 129–131. 1918.—The author describes a new form of the above species namely, var. *pauciramosum*, forma *multiramosum* Fernald.

1089. Fernald, M. L. **Some allies of Rynchospora macrostachya.** Rhodora 20: 138–140. 1918.—Fernald discusses the detailed characters of *Rynchospora macrostachya* Torr. and *R. corniculata* (Lam.) Gray, raises *R. macrostachya*, var. *inundata* Fernald and *R. macrostachya*, var. *patula* Chapm. to specific rank (renaming the latter as *Rynchospora Careyana* Fernald), and describes a new variety namely, *R. corniculata* (Lam.) Gray, var. *interior* Fernald, which ranges in distribution from Alabama to Texas, Arkansas, and Indiana.

1090. Fernald, M. L. **The specific identity of Bidens hyperborea and B. colpophila.** Rhodora 20: 146–150. 1918.—The author concludes that *Bidens colpophila* Fernald & St. John is conspecific with *B. hyperborea* Greene, and differentiates three varieties of the latter namely, *colpophila, cathancensis*, and *gaspensis*.

1091. Fernald, M. L. **Carex paupercula, var. brevisquama, n. var.** Rhodora 20: 152. 1918.—This new variety of sedge is described from material collected in Charlevoix County, Quebec.

1092. Foxworthy, F. W. **Philippine Dipterocarpaceae. II.** Philip. Jour. Sci. Bot. 13: 163–199. *Pl. 1, 2.* 1918.—The author presents a revision of the Dipterocarpaceae of the Philippine Islands, recognizing nine genera and seventy species of which seventeen are described as new to science.

1093. Gates, R. Ruggles. **A systematic study of the North American Melanthaceae from the genetic standpoint.** Jour. Linn. Soc. Bot. 44: 131–172. *Pl. 5.* 1918.—The title of this paper is aptly chosen to indicate the point of view from which the study was approached. The author makes no pretence to an exhaustive taxonomic treatment of the Melanthaceae but rather presents a general survey of a relatively compact group of genera (about twenty) based primarily on characters arising from definite and often discontinuous variation, par-

ticularly with reference to the genesis and relationships of the different generic elements included. Several new combinations occur in the text.

1094. Greenman, J. M. **Monograph of the North and Central American species of the genus Senecio. Part II.** Ann. Missouri Bot. Gard. 5: 37–107. *Pl. 4–6.* 1918.—The present installment treats the section *Tomentosi* Rydb. which comprises thirty-five species and several varieties. Two new species *Senecio Muirii* from California and *S. molinarius* from Colorado, are proposed, and a few new varieties, new combinations, and new names are included.

1095. Greenman, J. M., and Norma E. Pfeiffer. **A new Selaginella from Mexico.** Ann. Missouri Bot. Gard. 5: 205–210. *Pl. 11–12.* 1918.—A new species of the *Selaginella rupestris* group, *S. Landii*, is described from the granite boulders of the San Estaban Mountains in the State of Jalisco, Mexico, and dedicated to its collector.—*Norma E. Pfeiffer.*

1096. Henry, J. K. **A new variety of Rubus parviflorus.** Torreya 18: 54–55. *Fig. 1.* 1918.—*Rubus parviflorus* Nutt. var. *Fraserianus* Henry is illustrated and described as a new species from Vancouver Island.

1097. Johnston, I. M. **Some undescribed plants from southern California.** Bull. S. California Acad. Sci. 17: 63–66. 1918.—The author describes a new species of *Lupinus* (*L. elatus*), four new varieties in different genera, and places on record distributional notes on plants of southern California.

1098. Koorders, S. H. **Botanisch overzicht der Rafflesiaceae van Nederlandsch-Indië. Met determinatietabellen en soortbeschrijvingen, hoofdzakelijk naar Solms-Laubach.** *8vo. vi + 128 p., 19 pl., and Neuwe Addenda 124[1a], 124[1b].* G. Kolff & Co., Batavia, May, 1918.—A general consideration of the Rafflesiaceae of the Indo-Malayan region including the Philippines, accompanied by a full bibliography, keys to genera and species, and descriptions. Thirteen species of *Rafflesia* are recognized including the following new ones: *Rafflesia borneënsis* Koord., Borneo, *R. Witkampi* Koord., Borneo, *R. ciliata* Koord., Borneo, *R. zollingeriana* Koord., Java, and *R. atjehensis Koord., northern Sumatra, with four additional* ones which the author could determine only to the genus, and which are apparently new species. The other genera considered as *Brugmansia* with two species, *Richthofenia*, one species, and *Sapria*, one species. The photographic reproductions of *Rafflesia Arnoldii R.* Br. from the type locality (Bencolen, Sumatra) are especially good.—*Elmer D. Merrill.*

1099. Macbride, J. Francis. **A new species of Bladdernut.** Rhodora 20: 127–129. 1918.—*Staphylea Brighamii* Macbride is described. The type was collected near Toledo, Ohio.

1100. Macbride, J. Francis. **A new Perezia adventive in Massachusetts.** Rhodora 20: 150–152. 1918.—*Perezia aletes* Macbride is described as a new species. The plant was introduced into New England through seed in wool brought from South America.

1101. MacCaughey, Vaughan. **The Hawaiian Violaceae.** Torreya 18: 1–11. 1918.—Eleven species and varieties of *Viola* and three species of *Isodendrion* are enumerated from the Hawaiian Islands. A compiled description is given of each species and variety.

1102. MacCaughey, Vaughan, **The genus Gleichenia (Dicranopteris) in the Hawaiian Islands.** Torreya 18: 41–52. 1918.—Four species of *Gleichenia* are recognized from Hawaii; a description and notes are given of each species.

1103. Marshall, E. S. **Three apparently undescribed Irish Saxifrages.** Jour. Bot. 56: 65–67. 1918.—One new species of *Saxifraga* and two new varieties are described from Ireland.

1104. Maxon, William R. **A new Polystichum from California.** Jour. Washington Acad. Sci. 8: 620–622. 1918.—*Polystichum Dudleyi* is described from the Santa Cruz peninsula. The species is named in honor of the late Professor William R. Dudley.

1105. Maxon, William R. **The lip-ferns of the southwestern United States related to Cheilanhes myriophylla.** Proc. Biol. Soc. Washington **31**: 139–152. 1918.—The author concludes that *Cheilanthes myriophylla* is an andine species extending from northern Mexico to Bolivia and Argentina, but does not occur in the United States. Under the above title five species and one subspecies are treated in detail, and of these the following are new: *Cheilanthes Wootoni*, *C. Covillei*, and *C. Covillei* subsp. *intertexta*.

1106. Merrill, E. D. **The Bornean species of Eugenia, Schefflera, and Saurauia, represented in the Singapore Herbarium.** Jour. Straits Branch R. A. Soc. No. **79**: 19–35. 1918.—Twenty-three species of *Eugenia* are recorded from Borneo, and of this number *E. Kingii*, *E. monantha*, *E. subracemosa*, *E. subsessilifolia*, *E. lunduensis*, and *E. rhynchophylla* are published as new. To the six species of *Schefflera* hitherto known from Borneo, the following are added and described as new: *Schefflera borneensis*, *S. Burkillii*, *S. Havilandii*, and *S. racemosa*. Nine species of *Saurauia* are listed of which the following are described and indicated as new: *Saurauia glabra*, *S. spinulososetosa*, *S. Ridleyi*, and *S. Havilandii*. *Saurauia oblancifolia* Merrill, a new specific name, is given to *S. oblanceolata* Merrill, not Ridley.

1107. Merrill, E. D. **New or noteworthy Philippine plants. XIII.** Philip. Jour. Sci. Bot. 13: 1–66. 1918.—The present paper, like the preceding ones in this series, is devoted primarily to the description of new species. Those here proposed are: *Alocasia Wenzelii*, *A. maquilingensis*, *Aneilema humile*, *Smilax erecta*, *S. lucida*, *Quercus cagayanensis*, *Q. Mabesae*, *Elatostema gracilifolium*, *Aristolochia humilis*, *Cocculus sarmentosus* (Lour.) Diels, var. *stenophyllus*, *Michelia platyphylla*, *Matthaea intermedia*, *Capparis longipes*, *C. ilocana*, *Rubus Edanoii*, *Connarus subfoveolatus*, *Albizzia magaladenia*, *Neptunia depauperata*, *Spatholobus philippinensis*, *Evodia glaberrima*, *Tetractomia pachyphylla*, *Hippocratea megalocarpa*, *H. trichopetala*, *Salacia euphlebia*, *S. Wenzelii*, *Nephelium Schneideri*, *Ortophora cauliflora*, *Ventilago brunnea*, *Tetrastigma corniculatum*, *Elaeocarpus bontocensis*, *E. surigaensis*, *Abelmoschus Vanoverberghii*, *Sida longistipula*, *Saurauia Alvarezii*, *S. bicolor*, *S. glabrifolia*, *Casearia euphlebia*, *C. confertiflora*, *Homalium multiflorum*, *H. platyphyllum*, *H. villosum*, *Begonia Castilloi*, *B. tayabensis*, *B. apayaoensis*, *B. binuangensis*, *B. caudata*, *Mastixia tetrapetala*, *M. subcaudata*, *Boerlagiodendron Yatesii*, *B. Fenicis*, *B. tayabense*, *Diospyros Velascoi*. *D. tayabensis*, *Bassia cagayanensis*, *Ardisia nigromaculata*, *A. rivularis*, *Fragraea Curranii*, *F. Macgregorii*, *Alyxia revoluta*, *A. glabra*. *A. lanceolata*, *A. laxiflora*, *Kopsia laxinervia*, *Erycibe Sargentii*, *Callicarpa platyphylla*, *Solanum luzoniense*, *S. luzoniense* var. *glabrum*, *Hemigrapihs viridis*, *H. hirsutissima*, *H*, *pauciflora*, *Justicia dispar*, *Lepidagathis microphylla*, and *Alsomitra pubescens*. A new genus, **Ilocania** of the Cucurbitaceae, is described with a single species, *I. pedata*, from the island of Luzon.

1108. Merrill, E. D. **Species Blancoanae. A critical revision of the Philippine species of plants described by Blanco and by Llanos.** Bur. Sci. Publ. No. 12. *412 p., 1 folded map.* Manila [P. I.], 1918.—This work is concerned primarily with an enumeration of the species of Blanco's *Flora de Filipinas* and an interpretation of those species in the light of present knowledge of the Philippine flora. Opposite each Blancoan plant-name listed is given the name with which it is regarded by the author as synonymous. The text is amplified by copious annotations. Several sets of carefully prepared exsiccata have been distributed to leading herbaria; these specimens amply illustrate the author's interpretation, and make the work " Species Blancoanae " of practical value to the student of the Philippine flora.

1109. Merrill, E. D. **New species of Bornean plants.** Philip. Jour. Sci. Bot. **13**: 67–122. 1918.—This paper is the third of a series dealing with the Bornean flora and contains descriptions of sixty-one new species in the families Magnoliaceae, Connaraceae, Leguminosae, Rutaceae, Meliaceae, Euphorbiaceae, Sterculiaceae, Dilleniaceae, Passifloraceae, Flacourtiaceae, Myrtaceae, Araliaceae, Clethraceae, Myrsinaceae, Oleaceae, Gentianaceae, Asclepiadaceae, and Rubiaceae.

1110. MERRILL, E. D. **Notes on the flora of Loh Fau Mountain, Kwangtung Province, China.** Philip. Jour. Sci. Bot. 13: 123–161. 1918.—The author lists several genera and fifty-three species not hitherto recorded from Kwantung Province. Twenty-four species are described as new.

1111. MOORE, SPENCER LE M. **Alabastra diversa. Part XXVIII.** Jour. Bot. 56: 4–11, 36–40. 1918.—These studies are based on collections made in Africa by Archdeacon Rogers. Nineteen new species and one new variety of flowering plants are described, distributed among several genera.

1112. MOORE, SPENCER LE M. **Alabastra diversa. Part XXIX.** Jour. Bot. 56: 204–212, 225–233. 1918.—The author describes twenty-eight new species of Compositae from Africa, including a new genus, *Emiliella*, of the Senecionideae. One new species of *Jatropha* from Brazil is also characterized.

1113. MOSHER, EDNA. **The grasses of Illinois.** Univ. Illinois Agric. Exp. Sta. Bull. 205: 261–425. *287 fig.* 1918.—The aim of the author in this work has been to list all species of grasses known to occur in the state of Illinois. A key to the genera precedes the enumeration of species. Each species is described briefly, and the description is followed by a note on distribution and a paragraph containing citations of *exsiccata*. A limited synonomy and a very abbreviated bibliography are included. Sixty-three genera represented by two hundred and four species are listed in the publication.

1114. NELSON, A., AND J. FRANCIS MACBRIDE. **Western plant studies. V.** Bot. Gaz. 65: 58–70. 1918.—This paper contains a partial synopsis of northwestern members of the genus *Clarkia*; a new clover, *Trifolium Leibergii*; a new gentian, *Gentiana Covillei*; a new species of *Pentstemon* namely, *P. Albrightii* A. Nels.; new specific names as follows: *Allium scissum* (*A. incisum* Nels. & Macbr., not Fomine), *Clarkia superba* (*Godetia grandiflora* Lindl., not *Clarkia grandiflora* (F. & M.) Greene), *Tonestus eximius* (*Haplopappus eximius* Hall), *Prenanthes hastata* (*Sonchus hastata* Less.); and the following new combinations: *Sisyrinchium boreale* (*Hydastylus borealis* Bickn.), *Brodiaea coronaria* (*Hookera coronaria* Salisb.), *Clarkia delicata* (*Godetia delicata* Abrams), *C. biloba* (*Oenothera biloba* Durand), *C. epilobioides* (*Oenothera epilobioides* Nutt.), *C. Whitneyi* (*Oenothera Whitneyi* Gray), *C. amoena* (*Oenothera amoena* Lehm.), *C. amoena* forma *concolor* (*Godetia amoena* var. *concolor* Jepson), *C. amoena* forma *Lindleyi* (*Oenothera Lindleyi* Dougl.), *C. arcuata* (*Oenothera arcuata* Kell.), *C. caurina* (*Godetia caurina* Abrams), *C. Romanzovii* (*Oenothera Romanzovii* Ledeb.), *C. gracilis* (*Godetia gracilis* Piper), *A. quadrivulnera* (*Oenothera quadrivulnera* Dougl.), *C. viminea* (*Oenothera viminea* Dougl.), *C. purpurea* (*Oenothera purpurea* (Curtis) Bot. Mag. *pl. 352*), *K. Arnottii* (*Oenothera Arnottii* T. & G.), *C. decumbens* (*Godetia decumbens* Dougl.), *Nemophila pedunculata* Dougl. var. *sepulta* (*N. sepulta* Parish), *N. pedunculata* Dougl. var. *densa* (*N. densa* Howell), *N. heterophylla* F. & M. var. *tenera* (N. *tenera* Eastw.), *Pentstemon pandus* (*P. perpulcher* var. *pandus* Nels.), and *Castilleja miniata* Dougl. var. *Dixonii* (*C. Dixonii* Fernald).

1115. NELSON, J. C. **Additions to the flora of western Oregon.** Torreya 18: 21–35. 1918.—One hundred and fifty-three species of flowering plants are here listed as having been collected within the Oregon limits of Piper and Beattie's "Flora of the Northwest Coast," but not mentioned in that work. About sixty per cent. of this number, however, are said to be introduced. A second list of forty-five species of flowering plants is given, showing extension in hitherto recorded geographical range.

1116. OSTERHOUT, GEO. E. **A new Hymenopappus from Colorado.** Torreya 18: 90. 1918. —*Hymenopappus polycephalus* Osterhout is described as a new species.

1117. PARISH, S. B. **Notes on some southern California plants.** Bot. Gaz. 65: 334–343. 1918.—Parish records several species not hitherto reported from California, also several ad-

ditions to the known flora of the southern counties of the state. One new variety of clover, *Trifolium gracilentum* var. *reductum* Parish is described from Pilot Knob, Mojave Desert.

1118. PAULSEN, OVE. **A new Cereus from the West Indies.** Jour. Bot. 56: 235. 1918.—*Cereus venditus* is described as a species new to science, based on collections made by Eug. Warming on the island of St. Jan.

1119. PAYSON, EDWIN BLAKE. **The North American species of Aquilegia.** Contrib. U. S. Nation. Herb. 20: 133–157. *Pls. 8–14.* 1918.—The author finds that flower-structure presents the most constant differences and is of the highest value taxonomically. The genus embraces twenty-five species in North America; these are grouped in three sections namely, *Cyrtoplectrae*, *Rhodanthae*, and *Microplectrae*. The first section, typified by *Aquilegia saximontana*, represents the most primitive and probable ancestral type of the genus, and the *Macroplectrae*, typified by *A. longissima*, the most highly specialized and perhaps the most recent development. The comparative floral structure and phylogenetic relationship are graphically shown in a full-page illustration. The following new species are described: *Aquilegia lithophila*, *A. triternata*, *A. wawawensis*, *A, formosa* subsp. *dissecta*, and *A. formosa* subsp. *caelifax*. Three new combinations are included.

1120. PITTIER, HENRY. **New or noteworthy plants from Colombia and Central America. 7.** Contrib. U. S. Nation. Herb. 20: x + 95–132. 1918.—The author includes descriptions of upwards of thirty new species of flowering plants, belonging mostly to the Leguminosae. Several of the older and incompletely characterized species are redescribed in the light of recently acquired and more complete specimens.

1121. PRAEGER, R. LLOYD. **Notes on Sedum.** II. Jour. Bot. 56: 149–152. 1918.—In continuation of his studies on the genus *Sedum* the author describes two new species, *S. floriferum* from Wei-hai-Wei, China, and *S. Taquetii* from Korea, and two new varieties of probable Japanese origin.

1122. RIDLEY, H. N. **Hoseanthus Merrill, n. gen.** Jour. Straits Branch R. A. Soc. No. 79: 19. 1918.—The author reinstates *Hosea* Ridley a genus of the Verbenaceae, on the ground that the earlier *Hosea* Dennstedt was a *nomen nudum*, thus reducing *Hoseanthus* Merrill to synonomy.

✓ 1123. RIDLEY, H. N. **New and rare Malayan Plants. Series X.** Jour. Straits Branch R. A. Soc. No. 75: 63–100. 1918.—This article consists mainly of the descriptions of new species a list of which follows: *Sterculia brachycarpa*, *Eugenia limnoea*, *E. pauper*, *E. cyrtophylloides*, *E. Klossii*, *E. cordifoliata*, *Melastoma scabrum*, *Osbeckia perakensis*, *Allomorphia malaccensis*, *Sonerila patula*, *S. belluta*, *S. setosa*, *Memecylon Cantleyi*, *M. longifolium*, *M. grailipes*, *M. floribundum*, *M. malaccense*, *Uncaria parviflora*, *Coptosapelta parviflora*, *Argostemma rugosum*, *A. nervosum*, *A. grandiflora*, *A. trichanthum*, *Mussaenda spectabilis*, *Urophyllum coriaceum*, *Randia oocarpa*, *M. incurva*, *M. Roxburghii*, *Gardenia elata*, *Petunga conifera*, *Timonius hirsutus*, *Coffea viridiflora*, *Ixora montana*, *I. crassifolia*, *I. patens*, *I. fluminalis*, *Lasianthus bractescens*, *L. crassifolius*, *L. politus*, *L. villosus*, *L. glaberrimus*, *Morinda elliptica*, *Coelospermum biovulatum* Clarke, *Psychotria rudis*, *P. setistipula*, *P. minutiflora*, *Cephaelis angustifolia*, *C. elliptica*, *C. triceps*, *C. elongata*, *Erigeron oreophilum*, *Vaccinium loranthifolium*, *V. Wrayi*, *Ardisia singaporensis*, *Pelaquium calophylloides*, *Payena lanceolata*, *P. utilis*, *Linociera spicifera*, *L. parvifolia*, *Alstonia micrantha*, *Micrechites furcata*, *M. brachypetala*, *M. tenuifolia*, *Dischidia fruticulosa*, *Fagraea caudata*, *F. gigantea*, *Gaertnea sessiliflora*, *G. pedicellata* and *Monochoria elata*. One new genus, **Perilimnastes,** of the Melastomaceae is proposed being based on *Anerincleistus fruticosus* Ridl.

1124. ROCK, JOSEPH F. **New species of Hawaiian plants.** Bull. Torr. Bot. Club 45: 133–139. *Pl. 6.* 1918.—The following new species of plants are described: *Cyanea Giffardii*, *C. rollandiodidies*, *Rollandia angustifolia* (*R. longifolia* β var. *angustifolia* Hillbr.), *Lobelia oahuensis*, and *Strqussia glomerata.*

1125. Rock, Joseph F. **Pelea and Platydesma.** Bot. Gaz. 65: 261–267. *Fig. 1.* 1918.—The author presents critical notes on the two Rutaceous genera mentioned in the title and describes the following as new to science: *Pelea Gayana* (*P. sapotaefolia* Mann. var. (?) *procumbens* Hdb.), *P. cinerea* (Gray) Hbd. var. *rubra*, and *P. recurvata* (*P. kauaiensis* Hbd., not Mann.)

1126. Safford, W. E. **Chenopodium Nuttalliae, a food plant of the Aztecs.** Jour. Washington Acad. Sci. 8: 521–527. *Fig.* 3. 1918.—The author describes and illustrates a new species of *Chenopodium* from Mexico under the name given in the title.

1127. Sargent, C. S. **Notes on North American trees. I. Quercus.** Bot. Gaz. 65: 423–459. 1918.—This article consists of critical notes on North American oaks with descriptions and copious citations of material of several new species and varieties, chiefly from the southern and southwestern United States. Several new hybrid oaks are also defined and to these binomial names have been given.

1128. Sargent, C. S. **Notes on North American trees. III. Tilia. I.** Bot. Gaz. 66: 421–438. 1918.—The author presents an introductory article on a synoptical treatment of the American lindens. Fifteen species are included in the key and seven of these are described in detail. Five of the seven species described and seven varieties are characterized as new.

1129. Saxton, W. T., and L. J. Sedgwick. **Plants of northern Gujarat.** Records Bot. Surv. Ind. 6: 207–323. *Index, i–xiii, 1 folded map.* 1918.—The authors divide their paper into three parts namely, Part I "Descriptive and Analytical," Part II "Oecology," and Part III "Flora." Under the last caption upwards of 600 endemic or well established species of flowering plants are enumerated. No new species nor varieties are included.

1130. Smith, Charles Piper. **Studies in the genus Lupinus. II. The Microcarpi, exclusive of Lupinus densiflorus.** Bull. Torr. Bot. Club 45: 1–22. *Figs. 1–16.* 1918.—The present paper deals with the species of the subgenus *Platycarpos* Watson, a group peculiar to the west coast of America, in which the author recognizes six species namely, *Lupinus malacophyllus* Greene, *L. microcarpus* Sims, *L. horizontalis* Heller, *L. subvexus* C. P. Smith, *L. luteolus* Kell., and *L. densiflorus* Benth. The first five species are treated in detail, and several varieties are characterized. The same author (*ibid.* 167–202, *figs. 17–42*) discusses *Lupinus densiflorus* Benth. and differentiates twenty-five varieties.

1131. Standley, Paul C. **The North American species of Genipa.** Jour. Washington Acad. Sci. 8: 639–643. 1918.—The author describes two new species of the Rubiaceae from Panama namely, *Genipa Maxonii* and *G. Williamsii*.

1132. Stephenson, T., and T. A. Stephenson. **A new form of Helleborine viridiflora.** Jour. Bot. 56: 1–4. 1918.—A new form, *vectensis*, of this species is recorded from the Isle of Wight.

1133. Wernham, H. F. **New Rubiaceae from the Belgian Congo.** Jour. Bot. 56: 308–314. 1918.—The following new species of Rubiaceae are described: *Mussenda Nannanii*, *Sabicea congensis*, *Stipularia mollis*, *Tricalysia ealensis*, *Vangueria oblanceolata*, *Cuviera latior*, *Ixora Vermoesenii*, *Rutidea Vanderystii*, *Globulostylis cuvieroides*, and *Amaralia Batesii*.

1134. Wernham, H. F. **Dr. H. O. Forbes's New Guinea Rubiaceae.** Jour. Bot. 56: 68–77, 129–135. 1918.—Twenty-eight new species and a new variety are described, based on collections made in New Guinea in 1885–1886.

1135. Wernham, H. F. **The Genus Manettia.** Jour. Bot. 56: (Supplement) 1–16. 1918. —In continuation of his studies on tropical American Rubiaceae the author has begun a detailed revision of *Manettia*, a genus occurring chiefly in the American tropics.

1136. White, J. W. **Notes supplemental to the flora of Bristol.** Jour. Bot. 56: 11-18, 40-49, 77-87. 1918.—Critical notes on a relatively large number of species are recorded which are of particular interest to the student of the English flora.

1137. Wiegand, K. M. **Some species and varieties of Elymus in eastern North America.** Rhodora 20: 81-90. 1918.—This paper deals with *Elymus virginicus* and *E. canadensis* L. and their immediate allies. Seven species and several varieties are described and of these one species, *E. riparius*, and one variety, *E. robustus* var. *vestitus*, are characterized as new to science. *E. halophilus* Bicknell is treated as a variety of *E. virginicus* L.; and *E. glabriflorus* Scribner & Ball is treated as a variety of *E. australis* Scribner & Ball.

1138. Wiegand, K. M. **A new variety of Triosteum aurantiacum.** Rhodora 20: 116. 1918.—*Triosteum aurantiacum* var. *glaucescens* Wiegand is described from central New York and Pennsylvania.

1139. Wilmott, A. J. **Two new plants from Macedonia.** Jour. Bot. 56: 145-146. 1918.—*Paliurus microcarpus* and *Calamintha epilosa* are described; both species were discovered near Salonica.

1140. Wolf, W. **Quercus bernardiensis sp. nov.** Torreya 18: 161-162. 1918.—This new species of oak is described from specimens collected in Cullinan County, Alabama.